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## The Identity of *Pagurus brachiomastus* and Descriptions of Two New Species of *Pagurus* (Crustacea: Decapoda: Anomura: Paguridae) from the Northwestern Pacific

Tomoyuki Komai

*Department of Animal Sciences, Natural History Museum and Institute,  
Chiba, 955–2 Aoba-cho, Chuo-ku, Chiba, 260–8682 Japan*

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Critical examination of abundant material from various localities in Japan and the Russian Far East has revealed that three distinct species have been confounded under the name *Pagurus brachiomastus* (Thallwitz, 1891). The holotype of *Pagurus brachiomastus* is no longer extant; thus, in the interest of nomenclatural stability, a neotype is designated. *Pagurus brachiomastus* is redescribed and two new species, *P. proximus* and *P. simulans*, are described and illustrated. Differences in morphology and coloration are discussed. The three species are, for the most part, geographically or bathymetrically separated, although their distributions may partly overlap.

**Key Words:** Crustacea, Decapoda, Anomura, Paguridae, *Pagurus*, re-description, new species, neotype, northwestern Pacific.

### Introduction

*Pagurus brachiomastus* (Thallwitz, 1891) is one of the common hermit crabs occurring in shallow waters of northern Japan, and this name has been applied to virtually any small to moderately large, hairy hermit crab with a pair of prominent tubercles on the ventral surface of the merus of the right cheliped (Yokoya 1939; Miyake 1978, 1982). *Pagurus brachiomastus* was first described from a single specimen from “Japan oder China” (Thallwitz 1891).

Some years ago, I began to notice distinct differences in coloration among Japanese pagurids which appeared to be referable to *P. brachiomastus*. Detailed examination revealed some morphological differences that were correlated with the observed differences in coloration. Thallwitz’s original description of *Eupagurus brachiomastus* was brief, contrasting it only with *Eupagurus seriespinosus* Thallwitz, 1891, described in the same report [the latter nominal taxon is considered to be a junior subjective synonym of *Pagurus pectinatus* (Stimpson, 1858) (Balss 1913; Komai 2000)]. The type specimen of *Pagurus brachiomastus* was deposited in the Dresdener Museum, Germany, but it was lost during the last year of World War II (K. Schniebs, pers. comm.). As the result of a critical examination of abundant material from northeast Asian waters, including specimens reported by Miyake (1978), I have come to recognize three species. However, without selecting a neotype, it is impossible to establish the real identity of *P. brachiomastus*. Therefore, a neotype for *P. brachiomastus* is herein selected from material from the Pacific coast of Hokkaido, and the two species heretofore confounded with *P. bra-*

*chiomastus* are described as new, *P. proximus* and *P. simulans*.

Specimens used in this study are deposited in the following institutions: Natural History Museum and Institute, Chiba (CBM); Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University, Hakodate (HUMZ); Showa Memorial Institute, National Science Museum, Tsukuba (NSMT-CrR); Muséum national d'Histoire naturelle, Paris (MNHN); Zoologische Staatssammlung München (ZSM). One measurement, shield length (sl), provides an indication of the size of the specimens examined. The abbreviation "ovig" indicates ovigerous female(s). The general terminology used in the description follows McLaughlin (1974), with the exception of the posterior carapace (see Lemaitre 1995), fourth pereopod (see McLaughlin 1997), and gill structure (see McLaughlin and de Saint Laurent 1998). The drawings were made with the aid of a drawing tube mounted on Leica MZ-8 stereomicroscope.

### Taxonomy

#### *Pagurus brachiomastus* (Thallwitz, 1891)

(Figs 1A, B, 2–6)

*Eupagurus brachiomastus* Thallwitz, 1891: 35 (type locality: "Japan oder China"); Ortmann 1892: 312; Alcock 1905: 177; Terao 1913: 365.

*Pagurus brachiomastus*: Derjugin and Kobjakova 1935: 142; Makarov 1937: 60, fig. 9; 1938a: 409; 1938b: 211, pl. 2, fig. 6; 1962: 200, pl. 2, fig. 6; Vinogradov 1950: 227 (?part), fig. 124; Gordan 1956: 327 (bibliography); Miyake 1957: 87; Kobjakova 1958: 238; 1967: 240; Igarashi 1970: 7, pl. 5, fig. 16; Miyake 1978, pl. 1, figs 7, 8; Takeda 1982: 69, fig. 205; Komai *et al.* 1992: 197.

*Eupagurus pectinatus*: Urita 1942: 42 (part).

*Pagurus pectinatus*: Miyake 1975: 116, 272, unnumbered fig.; 1982: 132, pl. 44, fig. 3; Takeda and Hayashi 1990: 52; Takeda 1994: 228, figs 1, 2. Not *Pagurus pectinatus* Stimpson, 1858: 87. See "Discussion."

?*Pagurus brachiomastus*: Takeda and Miyauchi 1992: 143; Wang 1994: 570.

Not *Eupagurus brachiomastus*: Kikuchi 1932: 8; Yokoya 1939: 282 (part), fig. 12. (= *Pagurus proximus* sp. nov). See "Discussion."

Not *Pagurus brachiomastus*: Kim 1970: 7; 1973: 236, 601, pl. 70, fig. 36. (= *Pagurus proximus* sp. nov.). See "Discussion."

Not *Pagurus brachiomastus*: Miyake 1978: 97, text-figs 36, 37. (= *Pagurus simulans* sp. nov). See "Discussion."

Not *Pagurus brachiomastus*: Takeda and Hayashi 1990: 52. (= ?*Pagurus parvispina* Komai 1997: 114, figs 1–4). See "Discussion."

**Material examined.** *Neotype*. Usujiri Fishery Port, Pacific coast of southern Hokkaido, 3–4 m; Apr 1994; trap; coll. T. Komai; male (sl 11.3 mm); CBM-ZC 651.

*Other material*. Japan. Off Usujiri, Pacific coast of southern Hokkaido, 15–25 m; 11 June 1993; dredge; coll. F. Muto; 3 males (sl 3.9–5.5 mm); CBM-ZC 90.—Aikappu, Akkeshi, eastern Hokkaido, 3–4 m; 16 Dec 1991; SCUBA diving; 1 ovig (sl 9.0 mm); CBM-ZC 5082.—Katsurakoi Fishing Port, Kushiro, eastern Hokkaido, 0–1 m; 18 Aug 1996; hand; coll. O. Yamamura; 1 male (sl 11.7 mm), 1 female (sl 6.7 mm); CBM-ZC 5162.—Same data as neotype; 1 male (sl 11.6 mm); CBM-ZC 5163.—Esan, southern

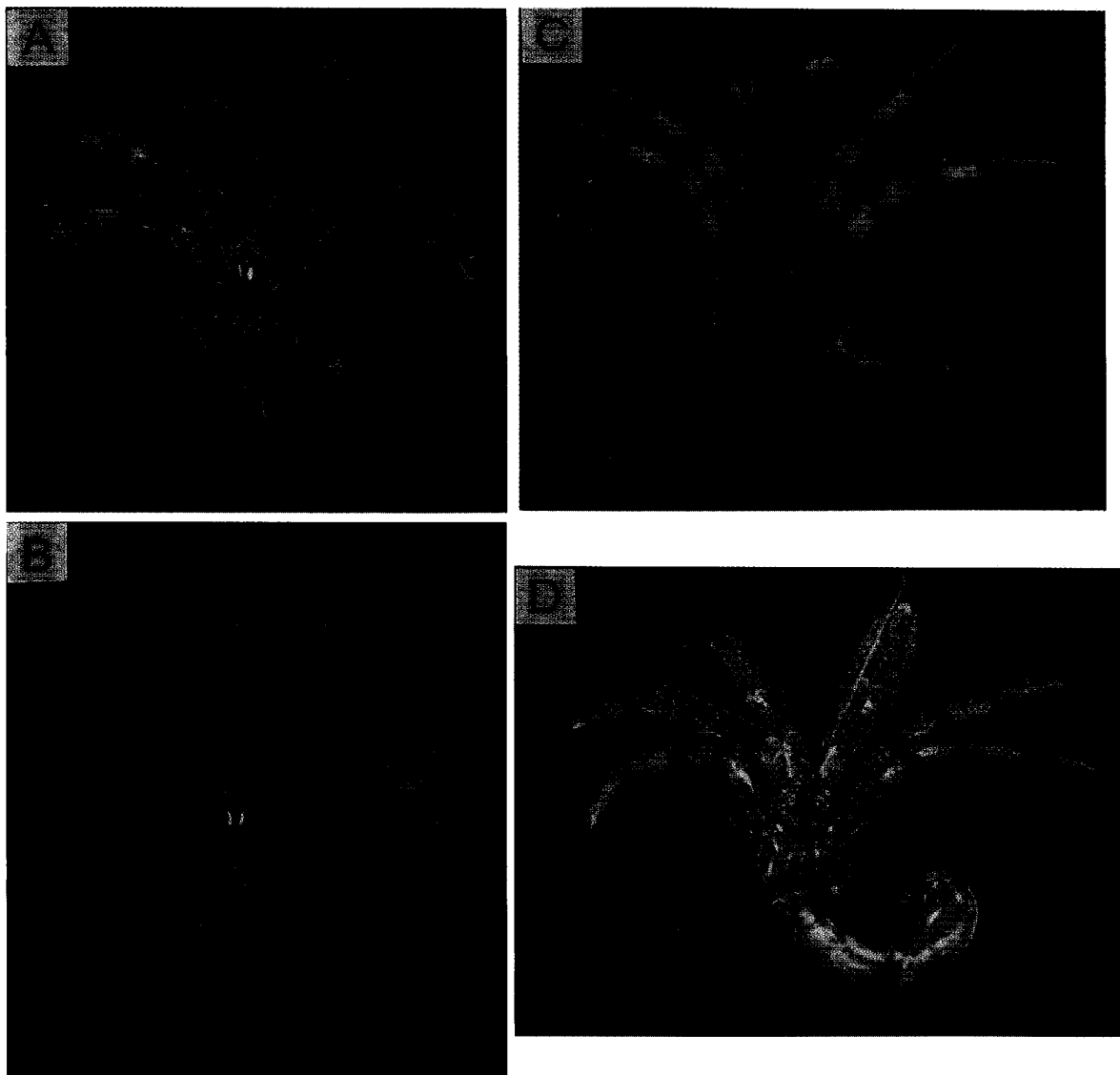


Fig. 1. Entire animals in dorsal view. A, *Pagurus brachiomastus* (Thallwitz, 1891), adult male from Akkeshi, eastern Hokkaido (sl 5.6 mm; CBM-ZC 5239); B, *P. brachiomastus*, young male from Akkeshi (sl 4.4 mm; CBM-ZC 5239); C, *Pagurus proximus* sp. nov., paratype male from Inubo-zaki, Choshi (sl 4.4 mm; CBM-ZC 5160); D, *Pagurus simulans* sp. nov, paratype male from off Takeoka, Boso Peninsula (sl 4.8 mm; CBM-ZC 5196).

Hokkaido, intertidal; 4 June 1999; hand; coll. S. Wada; 12 males (sl 2.4–5.3 mm), 7 females (sl 3.1–5.0 mm), 1 ovig (sl 5.3 mm); CBM-ZC 5164.—Abashiri, Okhotsk coast of Hokkaido, subtidal; Sept 1999; hand; coll. S. Chiba; 1 female (sl 6.5 mm), 1 ovig (sl 7.0 mm); CBM-ZC 5181.—Furube, Pacific coast of Oshima Peninsula, southern Hokkaido, intertidal; 4 June 1999; hand; coll. S. Wada; 11 males (sl 2.0–4.5 mm), 5 females (sl 2.7–3.6 mm), 1 ovig (sl 4.4 mm); CBM-ZC 5231.—Akkeshi, eastern Hokkaido; 9 Sept 1999; hand; coll. S. Wada; 5 males (sl 2.6–5.6 mm), 1 female (sl 4.1 mm); CBM-ZC 5239.—Usujiri Fishing Port, 0–1 m; July 1988; dip net; coll. T. Komai; 2 males (sl 3.9, 8.7 mm); HUMZ-C 761.—Konbu-mori, Kushiro, eastern Hokkaido, intertidal; 22 July 1990; hand; coll. T. Komai; 2 males (sl 6.7, 9.6 mm), 2 females (sl 5.3,

5.5 mm); HUMZ-C 2096.—Same data as CBM-ZC 5231; 1 male (sl 4.3 mm), 2 females (sl 3.2, 4.5 mm); MNHN-Pg 5893. Russian Far East. Slednaya Bay, Primoriye, 1 m; 24 Apr 1994; beach seine; coll. M. Yabe; 2 males (sl 6.3, 6.4 mm), 1 female (sl 4.8 mm); CBM-ZC 5083.—Bolshoi Pelis Island, Primoriye, intertidal; 27 Sept 1999; hand; coll. T. Hosono; 2 females (6.7, 7.1 mm); CBM-ZC 5182.

**Redescription.** Eleven pairs of biserial phyllobranchiae.

Shield (Fig. 2A) 1.0–1.1 times longer than broad; anterolateral margins sloping; anterior margin between rostrum and lateral projections slightly concave; lateral margins slightly convex; posterior margin roundly truncate; dorsal surface slightly convex, with paired tufts of short, stiff setae circumscribing gastric region and 3 tufts of setae anteriorly in mid-line. Rostrum slightly overreaching lateral projections, obtusely triangular, terminating in blunt or acute point, partially obscured by tufts of setae. Lateral projections each with tiny marginal spine directed anterolaterally. Posterior carapace (Fig. 2B) poorly calcified except for moderately well calcified posteromedian plate, with numerous tufts of stiff setae laterally; accessory portions very broad, their posterior margins as broad as or slightly broader than posterior margin of shield; posteromedian plate with longitudinal row of tufts of setae near cardiac sulci; cardiac sulci extending beyond midlength of posterior carapace, divergent posteriorly; sulci cardiobranchiales slightly divergent posteriorly, not reaching posterior ends of cardiac sulci.

Ocular peduncles (Fig. 2A) 0.48–0.62 times as long as shield and 4.0–4.5 times longer than corneal width, somewhat inflated basally; corneal region not dilated; dorsal surface with longitudinal row of tufts of short setae mesially. Ocular acicles subtriangular, each with small submarginal spine.

Antennular peduncles (Fig. 2A) relatively short and stout, exceeding ocular peduncles by 0.2–0.3 length of ultimate segment. Ultimate segment 0.22–0.34 times as long as shield and 1.2–1.3 times longer than penultimate segment, dorsally with few setae. Basal segment laterally unarmed; statocyst lobe defined by shallow notch laterally.

Antennal peduncles (Fig. 2A) moderately short, slightly overreaching distal margin of corneas of ocular peduncles; supernumerary segmentation present. Fifth and fourth segments with few tufts of short setae laterally and mesially. Third segment with ventromesial distal angle bearing small spine, obscured by tufts of setae. Second segment with dorsolateral distal angle produced, terminating in simple or bifid spine, mesial margin of projection with 3 or 4 small spines, lateral margin with few tufts of setae; dorsomesial distal angle with small spine, mesial face with numerous setae. First segment with small spine on lateral face distally; ventromesial margin produced, with row of tiny spines or tubercles. Antennal acicles moderately long, reaching midlength of fifth segment, weakly arcuate, terminating in acute spine; dorsomesial face with row of tufts of long, stiff setae; mesial margin unarmed. Antennal flagellum long, distinctly overreaching tip of right cheliped; each article with several minute bristles distally.

Mandible (Fig. 3A) with 2 triangular teeth on mesiodistal margin of incisor process. Maxillule (Fig. 3B) with proximal endite subquadrate; endopod (Fig. 3C) with 1 seta on produced inner lobe, outer lobe recurved. Maxilla (Fig. 3D) with endopod reaching anterior margin of scaphognathite, bearing prominent basal lobe on internal margin. First maxilliped (Fig. 3E) with endopod about 0.7 length of exopod; exopod noticeably inflated proximally. Second maxilliped (Fig. 3F) with in-

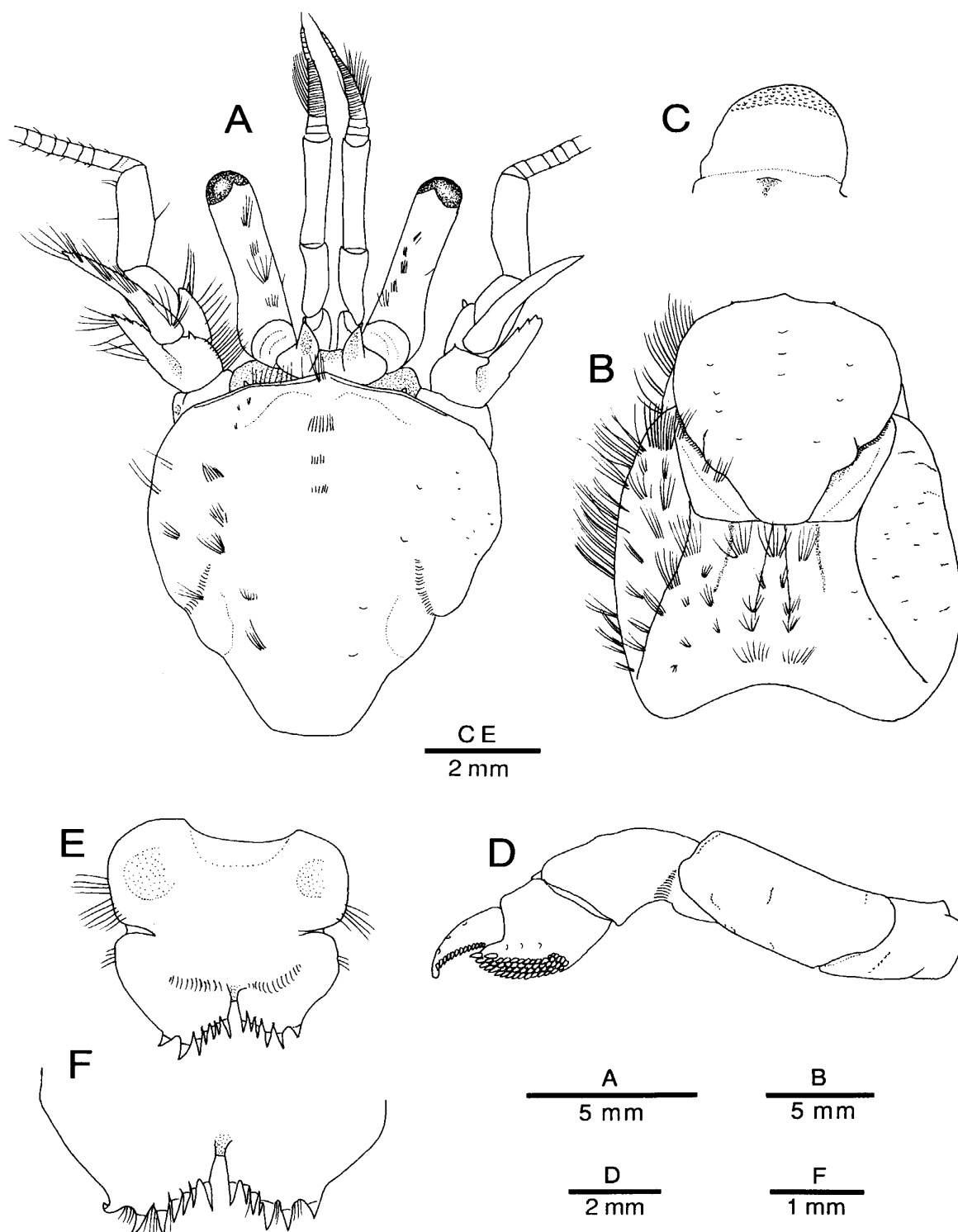


Fig. 2. *Pagurus brachiomastus* (Thallwitz, 1891). Neotype, male (sl 11.3 mm; CBM-ZC 651) from Usujiri Fishery Port, Pacific coast of southern Hokkaido. A, shield and cephalic appendages, dorsal, setae omitted from right side; B, carapace, dorsal, setae partially omitted; C, anterior lobe of sixth thoracic sternite, setae omitted; D, left fourth pereopod, lateral, setae omitted; E, telson, dorsal; F, posterior lobes of telson, dorsal.

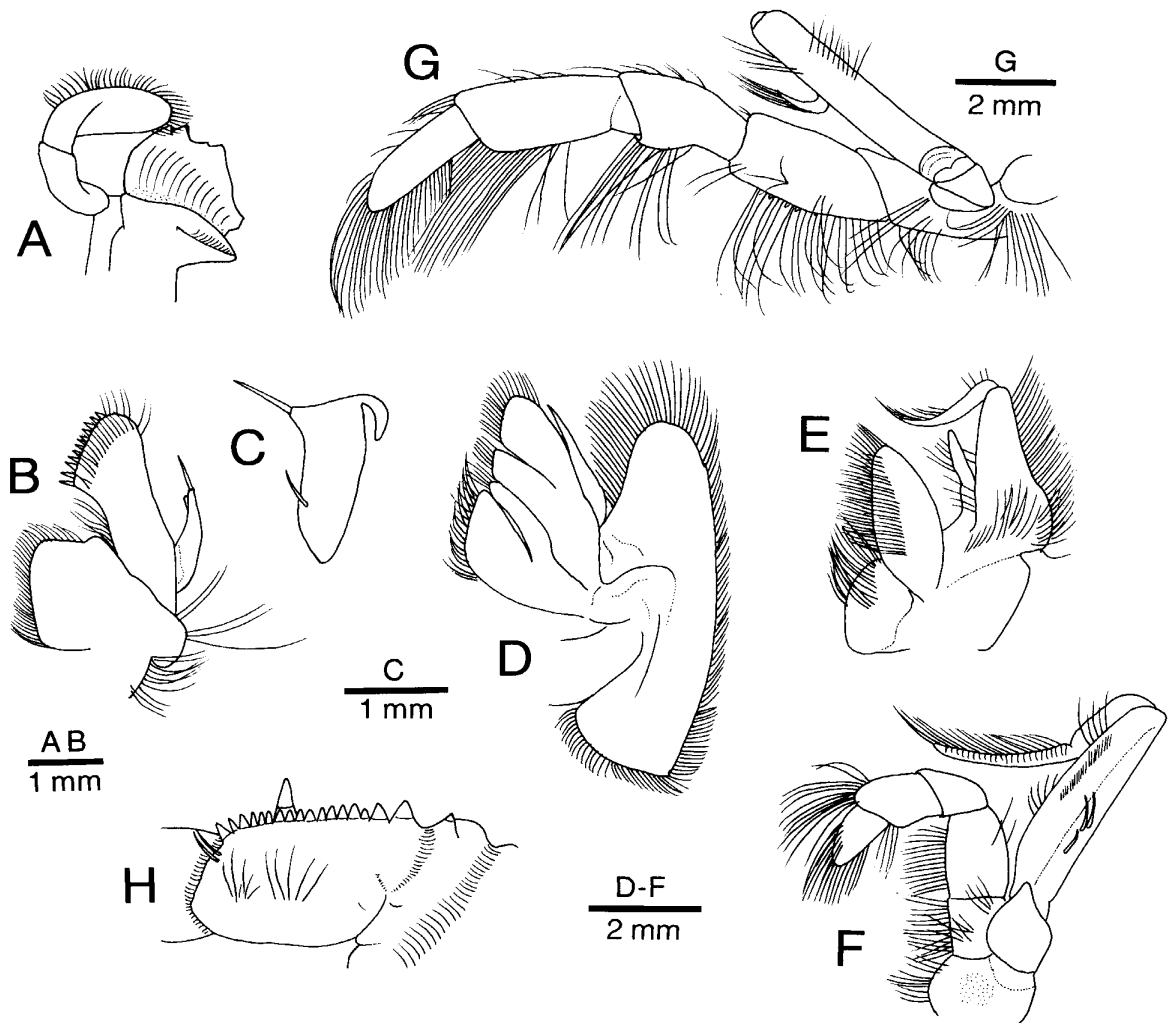


Fig. 3. *Pagurus brachiomastus* (Thallwitz, 1891). Neotype, male (sl 11.3 mm; CBM-ZC 651) from Usujiri Fishery Port, Pacific coast of southern Hokkaido. Left mouthparts. A, mandible, internal; B, maxillule, external; C, endopod of maxillule, mesial; D, maxilla, external; E, first maxilliped, external; F, second maxilliped, external; G, third maxilliped, lateral; H, ischium of third maxilliped, dorsal (internal).

complete basis-ischium fusion. Third maxilliped (Fig. 3G) with ischium (Fig. 3H) bearing well developed crista dentata composed of corneous teeth becoming stronger proximally; accessory tooth strong; merus with 3 tiny spinules on ventromesial margin, dorsodistal margin unarmed; carpus unarmed on dorsodistal margin; dactylus slightly shorter than propodus; exopod distinctly overreaching distal margin of merus.

Right cheliped (Fig. 4A–E) considerably larger than left. Chela 1.8–2.1 times longer than broad, subtriangular in dorsal view, lateral margin slightly convex; narrow hiatus present between dactylus and fixed finger. Dactylus slightly flattened distally, 1.1–1.2 times longer than palm when measured along mesial margin, its surfaces with tufts of short to long setae; dorsal surface with row of few small spines; dorsomesial margin with single row of moderately small spines; mesial

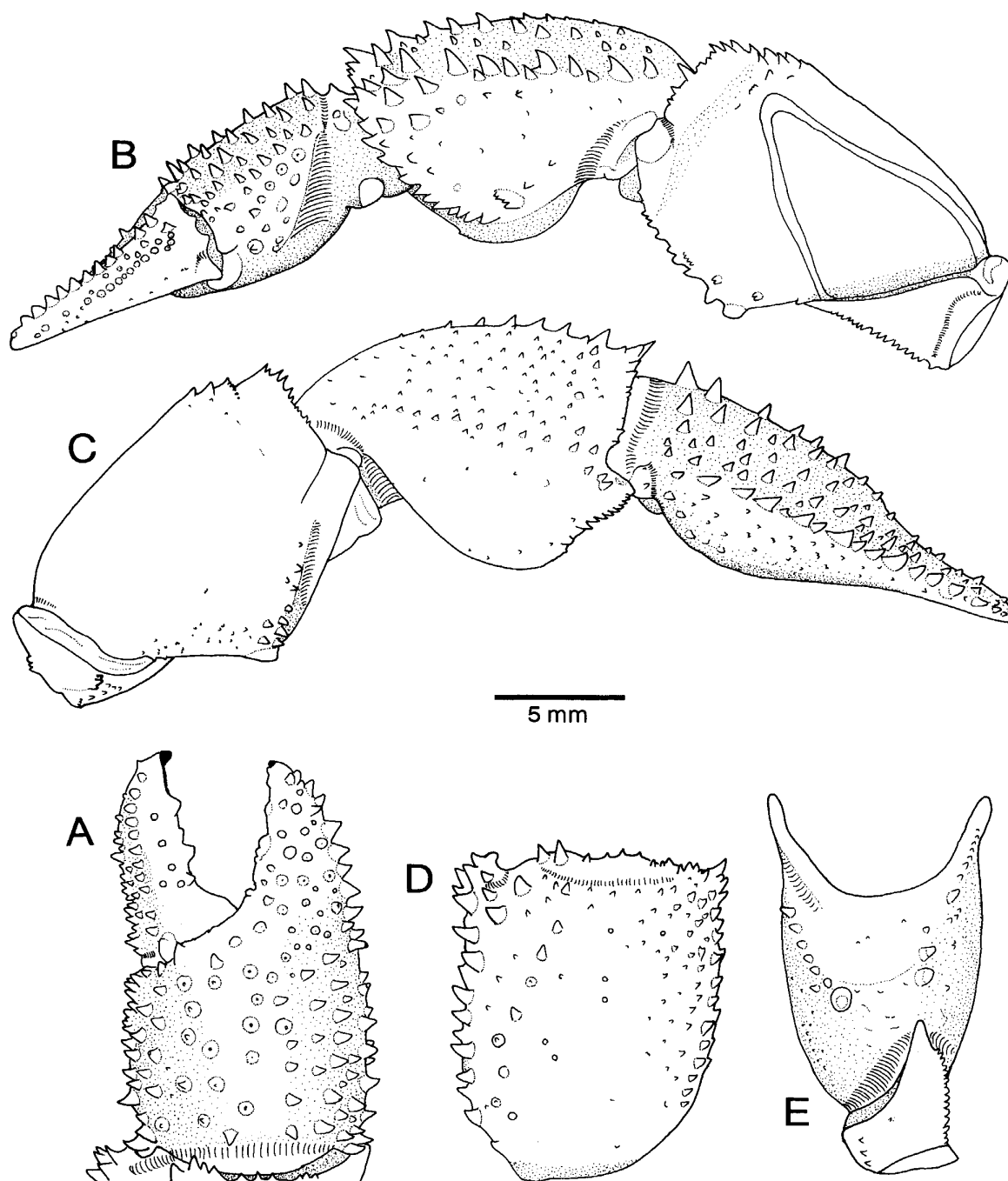


Fig. 4. *Pagurus brachiomastus* (Thallwitz, 1891). Neotype, male (sl 11.3 mm; CBM-ZC 651) from Usujiri Fishery Port, Pacific coast of southern Hokkaido. Right cheliped, setae omitted. A, chela, dorsal; B, entire cheliped, mesial; C, same, lateral; D, carpus, dorsal; E, merus, ventral.

face with single row of small spines, space between dorsomesial and mesial rows of spines proximally with additional short row of small spines; ventral surface unarmed; cutting edge with row of sparse calcareous teeth in proximal 0.8 and row of rudimentary corneous teeth in distal 0.2, terminating in strong corneous claw. Palm distinctly shorter than carpus when measured along mesial margin, weakly

inflated ventrally; dorsal surface weakly convex, with numerous small to large spines arranged in 6 or 7 irregular rows (excluding dorsolateral and dorsomesial rows); spines not elongate, each usually accompanied by tuft of short to long setae; dorsomesial margin not clearly delimited, with irregular row of small to moderately small spines; dorsolateral margin distinctly delimited by row of moderately strong spines decreasing in size proximally and distally on fixed finger; mesial face with moderately small spines dorsally and strong, occasionally multifid protuberances ventrally, some protuberances accompanied by tufts of short setae; lateral face with few scattered low tubercles or protuberances and few tufts of short setae; ventral surface with few small, low tubercles and tufts of setae. Fixed finger flattened distally; cutting edge with row of low calcareous teeth over entire length and fused corneous teeth between calcareous teeth in distal 0.3, terminating in small corneous claw. Carpus moderately short, slightly shorter than merus, strongly inflated ventrally, deeper than palm; dorsomesial margin with row of strong spines and tufts of long setae, dorsomesial distal angle slightly produced, with cluster of strong spines; dorsal surface convex, with 2 irregular rows of moderately small to strong spines mesially, numerous small spines medially and laterally, and scattered numerous tufts of long setae; dorsodistal margin with row of spines increasing in size mesially; dorsolateral margin not delimited; mesial face flattened, with short row of small spines near dorsomesial margin, 1 strong, multifid protuberance ventrally, and scattered tufts of long setae; mesiodistal and mesioventral margins with row of moderately small spines or spinulose tubercles; lateral face with few tiny, spinulose tubercles and tufts of setae dorsally; ventral surface strongly convex, with few tiny tubercles distally and tufts of short setae. Merus moderately short and relatively deep; dorsal surface with scattered spinulose tubercles and tufts of short setae in distal 0.2 and unarmed except for few short setae in proximal 0.8; dorsodistal margin with row of numerous small spines; mesial face with vertical row of tufts of setae along distal margin and few bifid or multifid tubercles or protuberances ventrally, ventrodistal margin with row of small spines increasing in size ventrally; lateral face with few tufts of setae distally and scattered tiny tubercles ventrally, ventrolateral margin with row of small spines; ventral surface with 2 prominent tubercles (lateral tubercle stronger than mesial) and few additional small spines, and with scattered numerous tufts of setae. Ischium with row of small spines on ventromesial margin; lateral face with small spines ventrally. Coxa unarmed, but with dense setae on ventral mesial surface.

Left cheliped (Fig. 5A–D) moderately short and stout, slightly overreaching base of dactylus of right cheliped. Chela 1.9–2.1 times longer than its greatest breadth and 1.1–1.2 times longer than carpus; prominent hiatus present between dactylus and fixed finger. Dactylus moderately long, 1.6–1.8 times longer than palm when measured along mesial margin, weakly curved laterally; dorsal surface with row of small spines laterally and tufts of setae; dorsomesial margin with row of sparse small spines or spinules; mesial and ventral faces unarmed, with few tufts of setae; cutting edge with row of small corneous teeth over entire length (teeth in proximal 0.4 minute), terminating in strong corneous claw, overlapped by fixed finger; with prominent hiatus when closed. Palm moderately short, 0.4–0.5 times as long as carpus, weakly inflated ventrally; dorsal surface with numerous tufts of long stiff setae and irregular rows of small to moderately small spines laterally and few small spines mesially; median area weakly elevated, with 2 rows of moderately

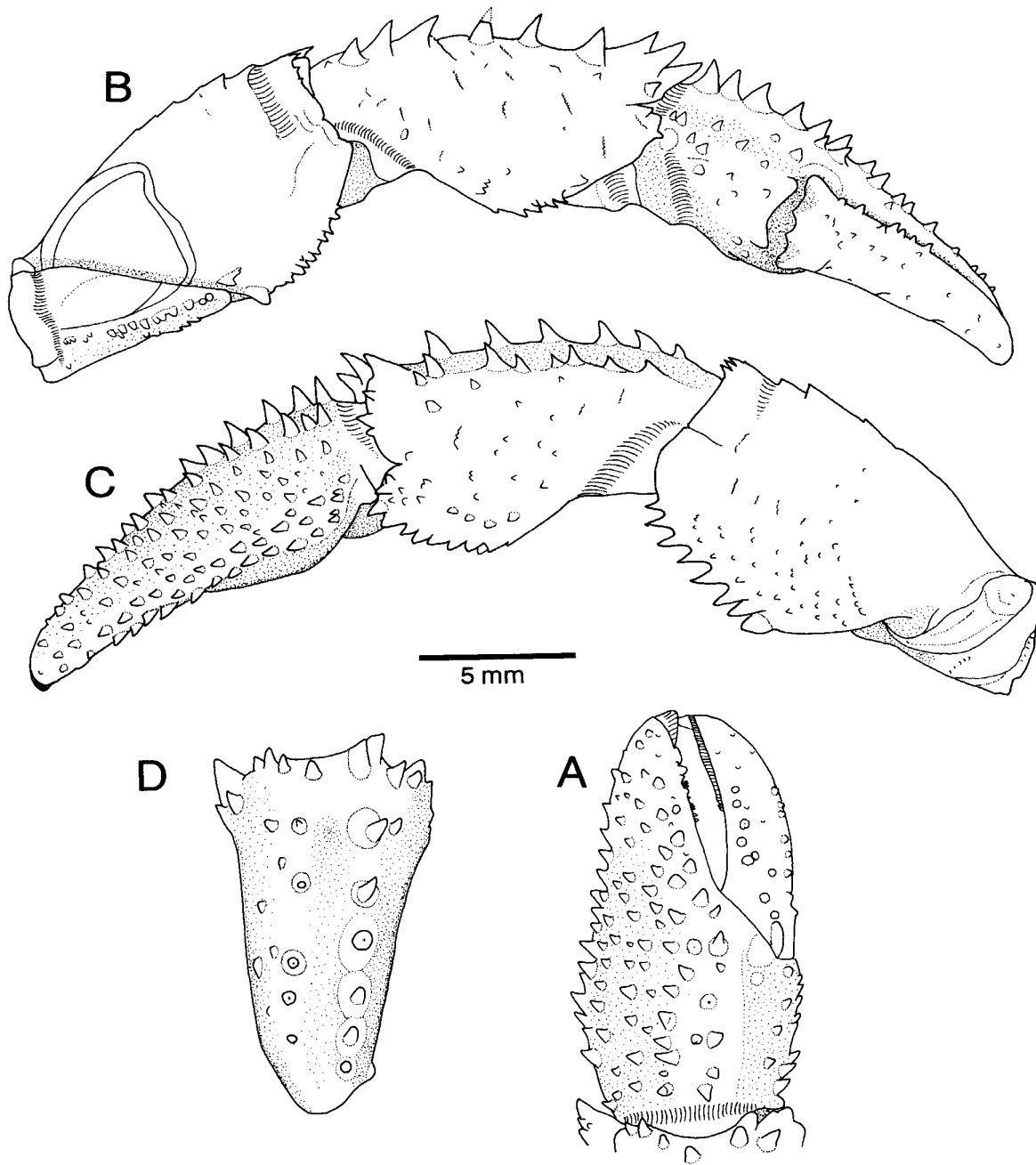


Fig. 5. *Pagurus brachiomastus* (Thallwitz, 1891). Neotype, male (sl 11.3 mm; CBM-ZC 651) from Usujiri Fishery Port, Pacific coast of southern Hokkaido. Left cheliped, setae omitted. A, chela, dorsal; B, entire cheliped, mesial; C, same, lateral; D, carpus, dorsal.

strong spines, extending onto fixed finger as single row of spines decreasing in size distally; ventrolateral margin distinctly delimited, with row of small to moderately small spines; dorsomesial margin not distinctly delimited, with row of sparse small spines; mesial face with scattered small spines and tufts of setae; ventral surface with few small tubercles and scattered tufts of long setae. Cutting edge of fixed finger with row of small calcareous teeth interspersed by short row of small cor-

neous teeth in distal 0.7, minutely denticulate in proximal 0.3, terminating in strong corneous claw. Carpus almost equal to merus in length; dorsal surface unarmed; dorsomesial and dorsolateral margins each with row of moderately strong to strong spines (spines of dorsolateral row smaller than those of dorsomesial row) and tufts of long setae; dorsodistal margin with row of spines; mesial face nearly flattened, with few small tubercles and short, obliquely vertical rows of long setae, ventrodistal margin with row of small, spinulose tubercles; lateral face with small spines or tubercles and tufts of long setae, ventrodistal margin with row of small to moderately small spines or tubercles; ventral surface with few small tubercles and numerous tufts of long setae distally. Merus slightly compressed laterally; dorsal surface with row of low, sometimes denticulate, protuberances accompanied by tufts of long setae; dorsodistal margin with 4 small spines; mesial face with short vertical ridges accompanied by setae subdistally and few setae dorsally and proximally, and with 1 tubercle ventrally near articulation to ischium; lateral face with small tubercles, multidenticate protuberances, and few tufts of short setae ventrally, ventrolateral margin with row of moderately small spines, proximalmost spine somewhat enlarged; ventral surface unarmed, but with numerous tufts of setae. Ischium with row of small spines on ventromesial margin; lateral face with small spines ventrally. Coxa unarmed, but with dense setae on ventral mesial surface.

Second pereopods (Fig. 6A) moderately long and relatively stout, not overreaching right cheliped. Dactyli (Fig. 6A, B) moderately short, 1.1–1.2 times longer than propodi, terminating in strong corneous claws; in lateral view slightly curved ventrally, in dorsal view nearly straight or slightly twisted; dorsal surfaces each with single row of small, slender corneous spines in distal 0.3 and 2 rows of tufts of long setae over entire length; lateral faces each with prominent median sulcus irregularly branched and 3 longitudinal rows of long setae; mesial faces each with prominent median sulcus irregularly branched and flanked by 2 rows of tufts of long setae and row of small corneous spines dorsally in distal half; ventral margins each with row of 8–12 moderately strong, corneous spines, increasing in size distally. Propodi distinctly longer than carpi; dorsal surfaces each with double row of small to moderately small spines and double row of tufts of long setae (spines on left smaller and fewer than on right); lateral face with 3 rows of tufts of long setae; mesial faces each with 3 or 4 irregular rows of tufts of setae; ventral faces with row of low protuberances each bearing small corneous spine and tufts of long setae, distal margin with 3 small corneous spines. Carpi with double row of strong, sometimes corneous-tipped spines, increasing in size distally, and with tufts of long setae on dorsal surfaces; lateral faces each with short, obliquely vertical row of long setae on midline, 2 irregular rows of tufts of setae dorsal to midline and few tufts of short setae ventral to midline; mesial faces each with 3 rows of tufts of setae; ventral faces unarmed, with few short setae. Meri strongly compressed laterally; dorsal surfaces each with row of low protuberances becoming obsolete proximally, and with tufts of long setae; lateral and mesial faces unarmed, with few short setae; ventral faces each with row of small spines and tufts of setae (spines on left smaller and fewer than on right), ventrolateral distal margin with row of tiny spines or tubercles, ventromesial distal margin with few tiny tubercles. Ischia unarmed dorsally and ventrally; dorsal faces with few tufts of setae; ventral faces with dense tufts of long setae. Coxae with rows of long setae on ventrolateral and

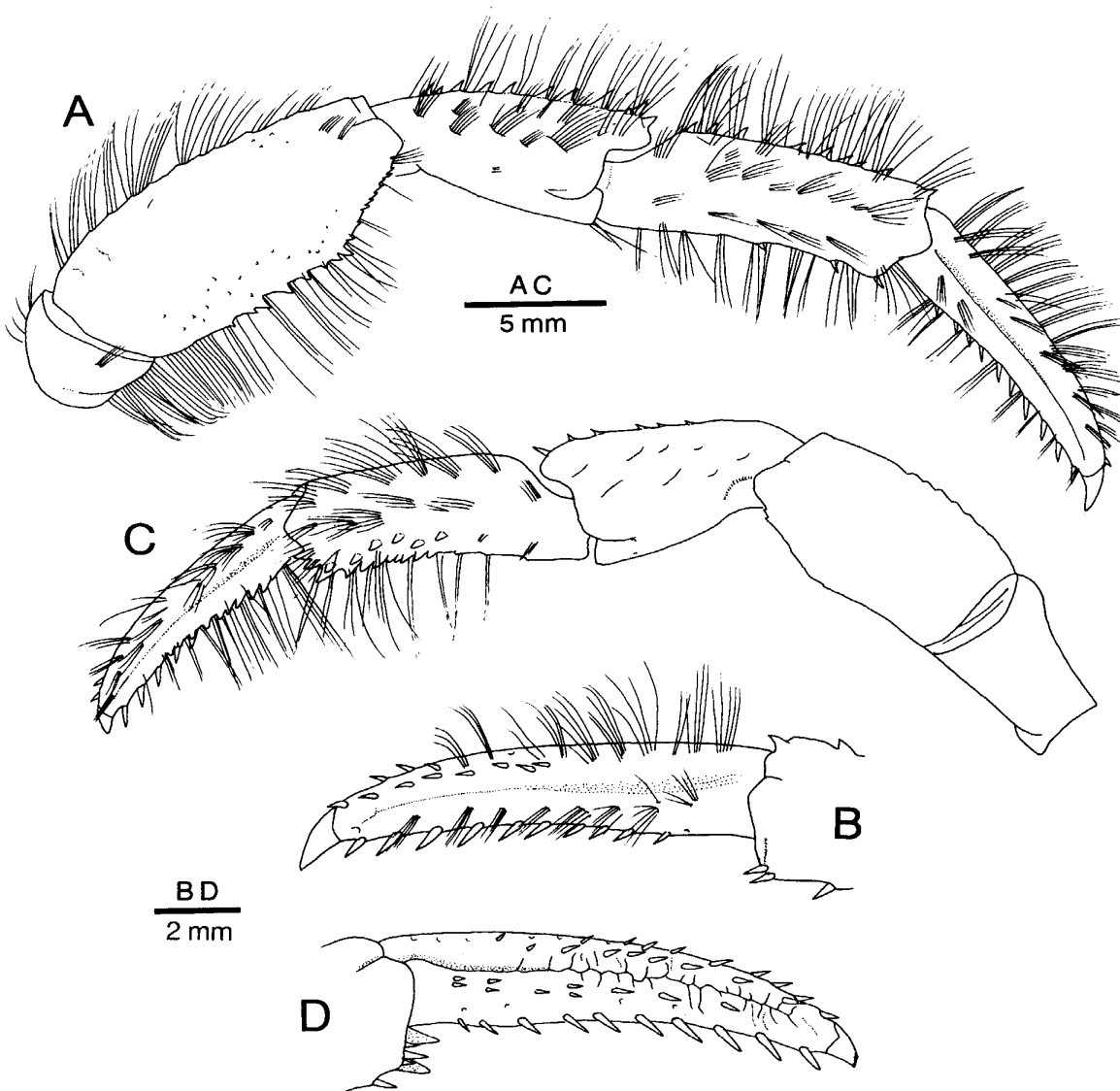


Fig. 6. *Pagurus brachiomastus* (Thallwitz, 1891). Neotype, male (sl 11.3 mm; CBM-ZC 651) from Usujiri Fishery Port, Pacific coast of southern Hokkaido. Ambulatory pereopods. A, right second pereopod, lateral; B, same, dactylus, mesial, setae partially omitted; C, left third pereopod, lateral, setae partially omitted; D, same, dactylus, mesial, setae omitted.

ventromesial margins.

Right third pereopod generally similar to second pereopods in setation and armature of dactylus and propodi. Dactylus with 2 rows of small corneous spines dorsally and 1 row of small corneous spines ventrally on mesial face; ventral margin with 10–14 corneous spines. Carpus with single row of small, corneous-tipped spines on dorsal surface. Merus unarmed on ventral margin, ventrolateral distal margin with tiny spine subdistally.

Left third pereopod (Fig. 6C) slightly more robust than right one, similar to second in general setation. Dactylus (Fig. 6C, D) 1.1–1.2 times longer than propodus, more strongly twisted than those of second and right third pereopods; dorsal

surface laterally with few small spinulose tubercles in proximal 0.3; lateral face ventrally with double row of small calcareous spines increasing in size proximally; mesial face with 2 rows of small corneous spines dorsally and 1 row of small corneous spines ventrally; ventral margin with 10 corneous spines. Propodus robust, 2.08–2.89 times longer than deep; lateral face with scattered small, calcareous spines near ventral margin; ventral surface laterally with double row of calcareous spines in distal 0.7 (spines increasing in size distally), extending onto ventrolateral distal margin, and with row of sparse corneous spines mesially. Carpus with row of small spines on dorsal surface. Merus unarmed on ventral margin, ventrolateral distal margin subdistally with few tiny denticles. Ischium with more sinuous dorsal margin than in right third pereopod. Paired gonopores present in females.

Fourth pereopods (Fig. 2D) semi-chelate. Dactylus curved, moderately long; dorsal surface with few tufts of short setae; ventral margin with row of small corneous teeth laterally; preungual process absent. Propodus with convex ventral margin; propodal rasp well developed, composed of 4 irregular rows of corneous scales. Dorsal margins of propodus, carpus, and merus with tufts of dense long setae.

Fifth pereopods chelate; males with paired gonopores, partially encircled by tufts of short setae.

Third thoracic sternite with small spine on either side of shallow median notch on anterior margin; ventral surface with dense tufts of setae anteriorly. Anterior lobe of sixth thoracic sternite (Fig. 2C) subsemicircular, slightly skewed to left; anterior face with numerous long setae. Eighth thoracic sternite with 2 rounded anterior lobes separated by shallow median sulcus, each bearing numerous long setae on ventral margin.

Abdomen strongly spiraled, with 3 unpaired left pleopods in males, 4 unpaired ones in females. Uropods strongly asymmetrical.

Telson (Fig. 2E) with deep transverse indentations. Anterior lobes each with convex lateral margin. Posterior lobes (Fig. 2F) slightly asymmetrical (left slightly larger than right), subtriangular, separated by deep, narrow median cleft; terminal margins slightly oblique without notch, each with row of 7 strong corneous spines, becoming stronger and more curved laterally; lateral margins generally convex, with few setae.

*Coloration in life.* Larger specimens (sl 4.9–11.7 mm) (Fig. 1A) generally olive gray. Shield with irregular brown markings on olive gray back ground. Posterior carapace brown, with olive tinge anteriorly; cardiac region with paired brown spots. Ocular peduncles generally brown, with obscure darker brown stripe dorso-laterally. Antennular peduncles dark brown, with tinge of olive on ultimate segment. Antennal peduncles generally brown; fifth segment with dark reddish brown longitudinal stripes laterally and mesially; third segment with olive gray mesial face; antennal flagellum generally brown, lateral and mesial faces dark reddish brown, showing longitudinal stripes. Exopods of first to third maxillipeds and endopod of third maxilliped olive gray. Chelipeds mottled with olive gray and brown; distal parts of dactyli and fixed fingers bright red, except for whitish spines or tubercles; spines and tubercles on palms and carpi orangish; meri olive gray with light brown markings in distal 0.25 and brown with scattered gray spots in proximal 0.75, proximal brown areas distally bordered by dark chocolate brown; 2

prominent tubercles on ventral surface of right merus marked by red or orange. Ambulatory pereopods generally olive gray with brown markings; lateral faces of dactyli bright red in distal half and brown in proximal 0.2, intermediate areas light gray or whitish; lateral surfaces of propodi olive gray in distal 0.5–0.6, distally with orange tinge, and chocolate brown in proximal 0.4–0.5; lateral faces of carpi proximally with brown tinge, dorsal spines, if present, brown or reddish brown; lateral faces of meri meidally with irregular markings and spots of chocolate brown.

Smaller specimens (sl 2.0–4.8 mm) (Fig. 1B). Shield light yellow-gray, laterally with brown markings. Posterior carapace generally olive gray; cardiac region brown. Ocular peduncles brown or olive, with obscure longitudinal stripes of darker brown dorsolaterally and dorsomesially. Antennular peduncles brown or olive. Antennal peduncles generally brown or olive; fifth segment with longitudinal stripes of darker brown laterally and mesially. Chelae generally light grayish brown, spines and tubercles on its dorsal surfaces whitish; distal 0.4 of dactyli and fixed fingers bright red; ventral faces of palms gray-brown, with scattered spots of brown; dorsal faces of carpi light gray-brown, laterally with scattered spots of brown, and with spines occasionally orangish; meri light yellow brown in distal 0.25, distally tinged with orange, and brown in proximal 0.75. Dactyli of ambulatory pereopods orange red in distal 0.4 and brown in proximal 0.2–0.3, intermediate areas light yellow brown; propodi tinged with orange and brown distally and proximally, and with row of brown spots dorsally and ventrally; carpi generally light yellow brown, dorsally tinged with brown and with row of brown spots on mid-line; meri light yellow brown distally and dark brown proximally (boundary strongly oblique).

**Size.** Largest male, sl 11.7 mm; largest female, 9.0 mm; ovigerous females, 4.4–9.0 mm.

**Remarks.** As seen in the description of the coloration, this species shows notable change in color with growth in the markings of the shield, chelipeds and ambulatory pereopods. However, the available material suggests that the change of the color and markings is not consistent with maturity, because I have encountered ovigerous specimens with the typical coloration of the young specimens.

**Habitat.** Occupying a variety of gastropod shells.

**Distribution.** The available material and information from literature suggest that this species is restricted to cold waters in northeast Asia: Peter the Great Bay, continental coast of the Sea of Japan, Sakhalin, and Hokkaido (excluding the coast facing Tsugaru Strait); intertidal to 25 m.

***Pagurus proximus* sp. nov.**  
(Figs 1C, 7–10)

*Eupagurus pectinatus*: Balss 1913: 60 (part). See “Discussion.”

*Eupagurus brachiomastus*: Kikuchi 1932: 8; Yokoya 1939: 282 (part), fig. 12. Not *Eupagurus brachiomastus* Thallwitz, 1891. See “Discussion.”

*Pagurus brachiomastus*: Kim 1970: 7; 1973: 236, 601, pl. 70, fig. 36. Not *Pagurus brachiomastus* (Thallwitz, 1891). See “Discussion.”

**Material examined.** *Holotype*. Off Hei-gawa rivermouth, Miyako Bay, Iwate

Prefecture, 10 m; 24 Mar 1995; gill net; coll. T. Komai; male (sl 10.0 mm); CBM-ZC 1684.

**Paratypes.** Japan. Kanbayashi Fishing Port, Miyako Bay, Iwate Prefecture, 2–3 m; 24 May 1995; trap; coll. T. Komai; 3 males (sl 3.2–3.6 mm); CBM-ZC 1698.—Ohara, Sotobo coast of Boso Peninsula, intertidal; 1996; hand; coll. M. Mitsuhashi; 4 males (sl 3.1–5.1 mm), 1 ovig (sl 5.5 mm); CBM-ZC 3651.—Inubo-zaki, Chiba Prefecture, intertidal; 19 Apr 1996; hand; coll. T. Komai; 5 males (sl 2.2–5.7 mm), 3 ovig (sl 2.4–3.4 mm); CBM-ZC 5160.—Tatsushima Fishing Port, Katsuyama, Uchibo coast of Boso Peninsula, 1–2 m; Nov 1998; trap; coll. T. Komai; 5 males (sl 3.2–6.1 mm), 2 females (sl 3.1, 3.7 mm); CBM-ZC 5161.—Niigata, Sea of Japan, intertidal; Aug 1999; hand; coll. M. Suzuki; 2 males (sl 5.3, 5.3 mm); CBM-ZC 5232.—Miyako Bay, Iwate Prefecture, 2–3 m; 4 Apr 1987; trap; coll. T. Komai; 3 males (sl 7.0–9.6 mm); HUMZ-C 48.—Kunibetsu, Hakodate Bay, 5–7 m; Nov 1986; round haul net; coll. T. Komai; 1 male (sl 5.2 mm), 1 female (sl 7.0 mm); HUMZ-C 59.—Kimigahama Beach, near Inubo-zaki, Chiba Prefecture, intertidal; 19 June 1993; hand; coll. T. Komai; 1 male (sl 5.5 mm), 2 females (sl 4.9, 4.9 mm); MNHN-Pg 5894. Russian Far East. Estuary of Volchanka River, Vostok Bay, Primoriye, 1 m; 23 Aug 1994; beach seine; coll. M. Yabe; 2 males (sl 3.0, 4.9 mm); CBM-ZC 2447.

**Other material.** Japan. Aomori; 1 female (sl 7.3 mm); identified by Balss (1913) as *Eupagurus pectinatus*; ZSM 296/2.

**Description.** Shield (Fig. 7A) with anterolateral margins sloping or slightly terraced; anterior margin between rostrum and lateral projections nearly straight or slightly concave. Rostrum overreaching lateral projections, triangular, terminating in blunt or acute point. Lateral projections sometimes obsolete, each with small marginal spine directed anterolaterally. Posterior carapace with scattered tufts of setae, these becoming dense laterally; accessory portions moderately narrow, their posterior margins distinctly narrower than breadth of posterior margin of shield.

Ocular peduncles (Fig. 7A) 0.48–0.62 times as long as shield, 6.0–7.0 times as long as width of cornea, somewhat inflated basally; corneal region not dilated. Ocular acicles subtriangular, each with small submarginal spine.

Antennular peduncles (Fig. 7A) moderately long and slender, exceeding ocular peduncles by 0.2–0.3 length of ultimate segment when fully extended. Ultimate segment 0.28–0.36 times as long as shield and 1.2–1.3 times longer than penultimate segment. Basal segment laterally unarmed; laterodistal process of statocyst lobe not developed.

Antennal peduncles (Fig. 7A) moderately short, slightly overreaching distal margin of cornea of ocular peduncles; supernumerary segmentation present. First segment with ventromesial distal margin produced, bearing 2 small spines distolaterally. Antennal acicles moderately long, reaching midlength of fifth segment. Antennal flagellum long (sometimes greatly elongate), distinctly overreaching tip of right cheliped; each article with several minute bristles distally.

Maxillule with endopod (Fig. 7B) bearing 1 seta on produced inner lobe, outer lobe recurved. Third maxilliped with ischium bearing well developed crista dentata; accessory tooth strong; merus with few tiny spinules on ventromesial margin, dorsodistal margin unarmed; carpus unarmed on dorsodistal margin; dactyl slightly shorter than propodus; exopod distinctly overreaching distal margin of merus.

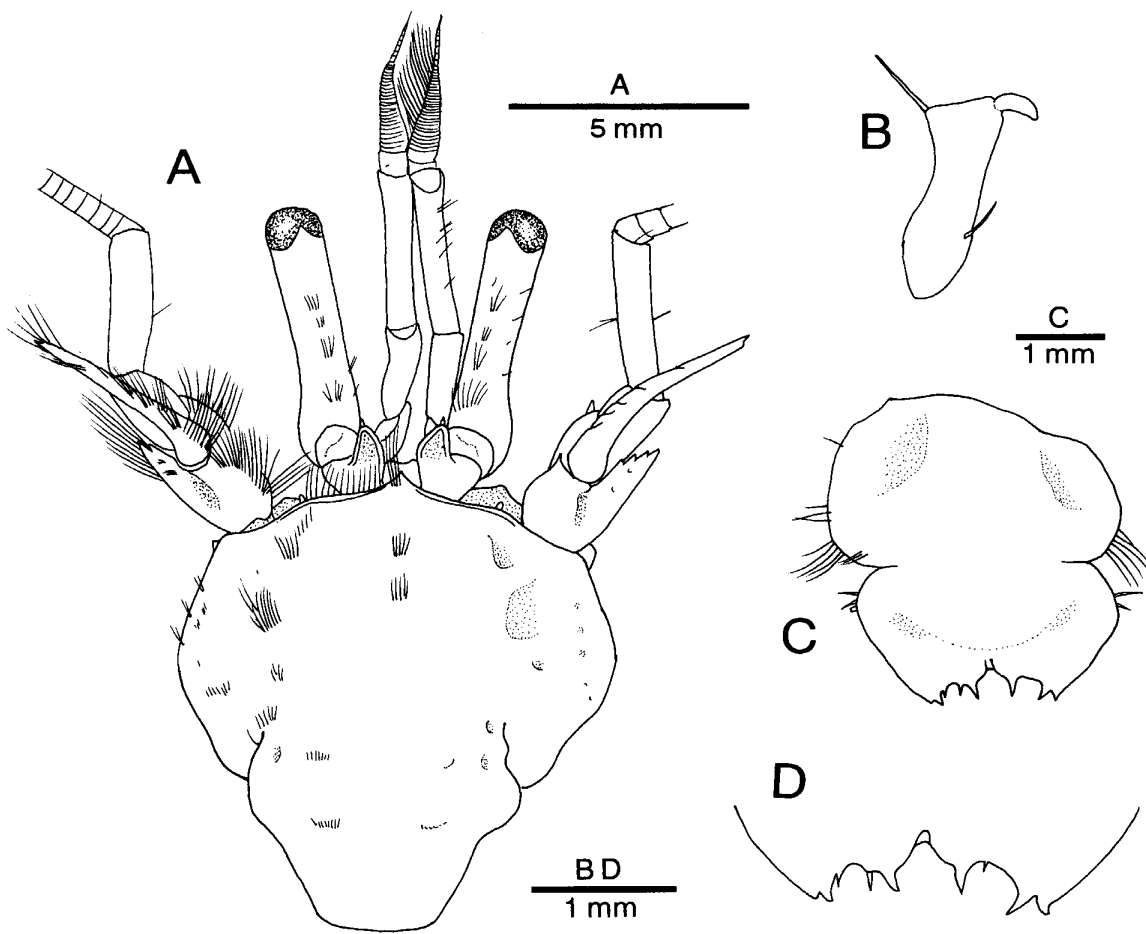


Fig. 7. *Pagurus proximus* sp. nov. Holotype, male (sl 10.0 mm; CBM-ZC 1684) from Miyako Bay, Iwate Prefecture. A, shield and cephalic appendages, dorsal, setae omitted from right side; B, endopod of maxillule, mesial; C, telson, dorsal; D, posterior lobes of telson, dorsal.

Right cheliped (Fig. 8A–D) considerably larger than left. Chela 1.7–2.0 times longer than broad, subtriangular in dorsal view; lateral margin slightly convex; narrow hiatus present between dactylus and fixed finger. Dactylus slightly flattened distally, 1.1–1.2 times longer than palm; dorsal surface with few small spines proximally; dorsomesial margin with single row of moderately small spines; mesial face with single or double row of small spines, space between dorsomesial and mesial rows of spines with few small spines proximally; cutting edge with row of low calcareous teeth in proximal 0.8 and row of rudimentary corneous teeth in distal 0.2, terminating in small corneous claw. Palm distinctly shorter than carpus, weakly inflated ventrally; dorsal surface weakly convex, with numerous small to large spines arranged in 6 or 7 irregular rows (excluding dorsolateral and dorsomesial rows); spines not strongly elongate and not inflated basally; dorsomesial margin not clearly delimited, with single row of moderately strong spines; dorsolateral margin distinctly delimited by row of moderately strong to strong spines decreasing in size proximally and distally on fixed finger; mesial face with scattered moderately small spines, spinulose tubercles, and multifid protuberances; lateral face with numerous scattered spinulose tubercles; ventral surface with few

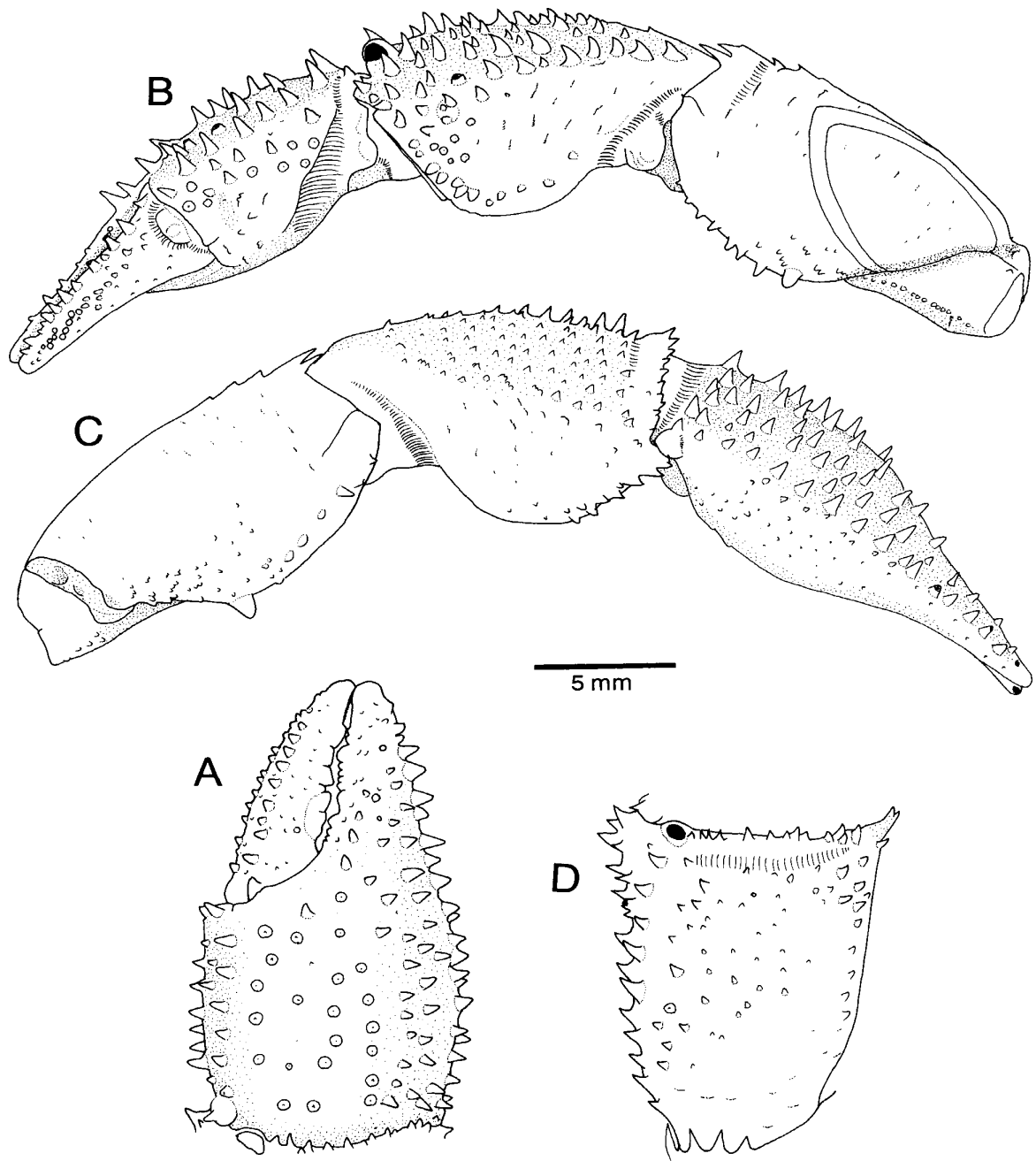


Fig. 8. *Pagurus proximus* sp. nov. Holotype, male (sl 10.0 mm; CBM-ZC 1684) from Miyako Bay, Iwate Prefecture. Right cheliped, setae omitted. A, chela, dorsal; B, right cheliped, mesial; C, same, lateral; D, carpus, dorsal.

small, denticulate protuberances. Fixed finger flattened distally; cutting edge with row of calcareous teeth in proximal 0.7, and in distal 0.3 only slightly dentate or bearing small calcareous teeth interspersed with short row(s) of corneous teeth, terminating in small corneous or calcareous claw. Carpus moderately short, as long as or slightly shorter than merus, moderately inflated ventrally, slightly deeper than palm; dorsomesial margin with single or double row of strong spines

and tufts of long setae; dorsal surface convex, with 2 irregular rows of moderately small to strong spines mesially, and scattered small spines medially and laterally; dorsodistal margin with row of spines; dorsolateral margin not distinctly delimited; mesial face nearly flattened, with row of moderately small spines near dorsomesial margin and scattered small spines and protuberances, distal and ventral margins with row of moderately small spines or spinulose tubercles; lateral face with few small, spinulose tubercles, ventrodistal margin with row of small spines; ventral surface convex, with few tiny tubercles distally. Merus moderately short and deep; dorsal surface with spinulose tubercles or multidenticulate protuberances and tufts of long setae in distal 0.2–0.3, remainder unarmed, distal margin with row of 3–5 slender spines; mesial face with few protuberances accompanied by tufts of setae subdistally and with spinules or bifid or multifid tubercles ventrally, ventromesial margin with row of spines proximally increasing in size; lateral face ventrally with scattered spinules, ventrolateral margin with row of moderately strong spines; ventral surface with 2 prominent tubercles and few additional small spines, and with numerous, scattered tufts of setae.

Left cheliped (Fig. 9A–D) moderately short and stout, overreaching base of dactylus of right cheliped. Chela 1.9–2.2 times longer than greatest breadth and 1.1–1.2 times longer than carpus; very narrow hiatus present between dactylus and fixed finger. Dactylus moderately long, 1.8–2.0 times longer than palm, slightly curved laterally, overlapped by fixed finger; dorsal surface proximally with few small tubercles, dorsomesial margin unarmed; mesial and ventral faces unarmed; cutting edge with row of small corneous teeth over entire length (teeth in proximal 0.4 minute), terminating in small corneous claw. Palm moderately short, 0.4–0.5 times as long as carpus, weakly inflated ventrally; dorsal surface with irregular rows of small to moderately small spines laterally and few scattered small spines or spinulose tubercles mesially; weakly elevated median area bearing 2 rows of moderately strong spines, extending onto fixed finger as single row of spines decreasing in size distally; lateral margin delineated by row of moderately strong spines decreasing in size distally on fixed finger; dorsomesial margin not distinctly delimited, but with row of sparse small spines; mesial face with scattered small tubercles and low protuberances; ventral surface with few small tubercles. Cutting edge of fixed finger with row of small calcareous teeth interspersed by short row of small corneous teeth, terminating in strong corneous claw. Carpus almost equal to merus in length; dorsal surface oblique, unarmed, dorsomesial and dorsolateral margins each with row of moderately strong to strong spines (spines on dorsolateral row smaller than those on dorsomesial row); dorsodistal margin with row of spines; mesial face with few small tubercles and short, obliquely vertical rows of long setae, ventrodistal margin with row of low protuberances or unarmed; lateral face with few small tubercles, ventrolateral margin with row of small spines or tubercles; ventral surface with few low protuberances. Merus slightly compressed laterally; dorsal surface with row of low protuberances, becoming denticulate transverse ridges distally; dorsodistal margin unarmed or with 1–3 spines; mesial face with short vertical ridges subdistally and few low protuberances ventrally, ventromesial margin with row of moderately small spines increasing in size proximally; lateral face with small tubercles and multidenticulate protuberances ventrally, ventrolateral margin with row of moderately strong spines, proximalmost one much stronger than others; ventral surface unarmed.

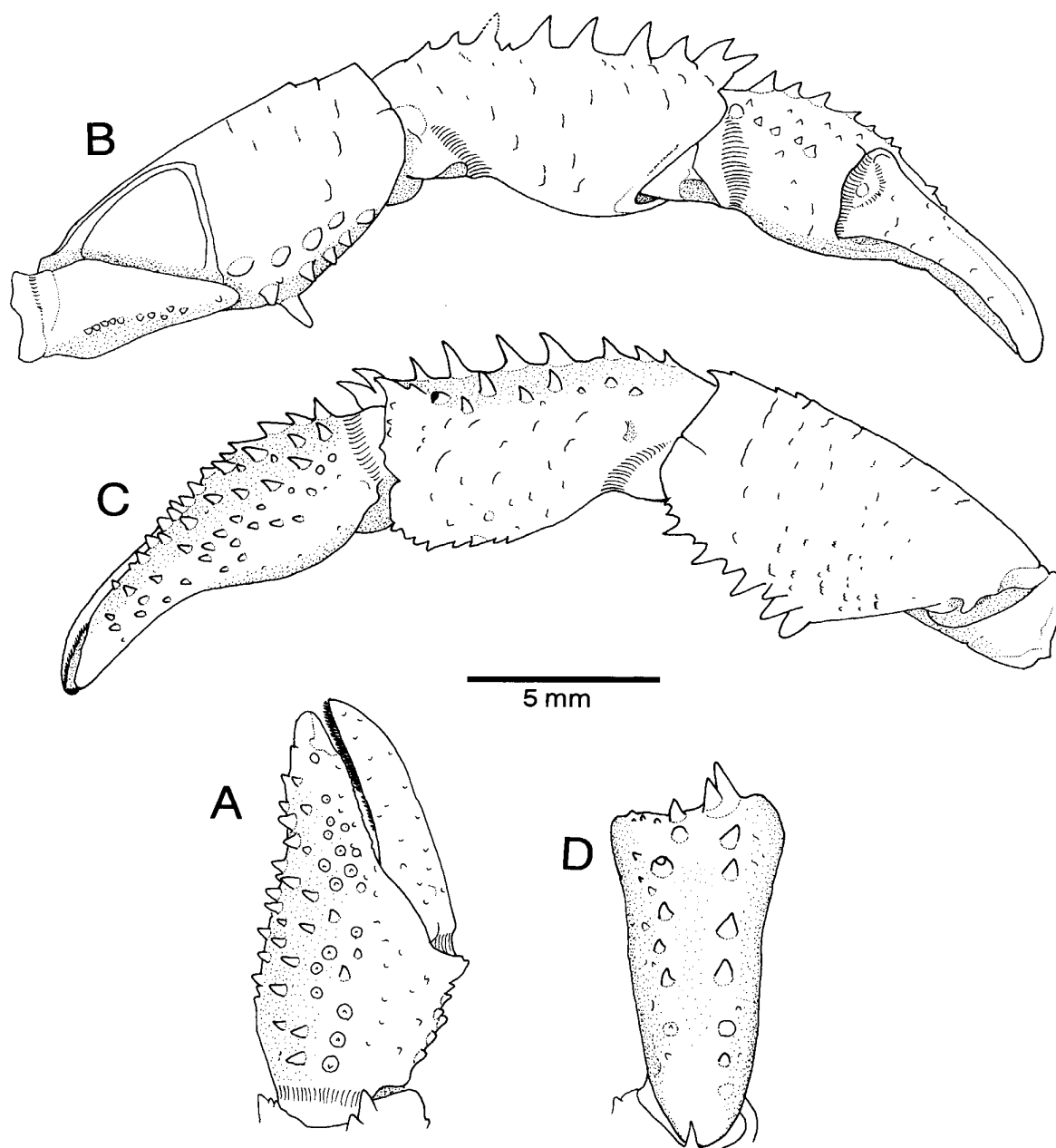


Fig. 9. *Pagurus proximus* sp. nov. Holotype, male (sl 10.0 mm; CBM-ZC 1684) from Miyako Bay, Iwate Prefecture. Left cheliped, setae omitted. A, chela, dorsal; B, entire cheliped, mesial; C, same, lateral; D, carpus, dorsal.

Second pereopods (Fig. 10A) moderately long and relatively slender, reaching or slightly overreaching right cheliped. Dactyli (Fig. 10A, B) moderately long, 1.0–1.2 times longer than propodi; lateral and mesial faces each with prominent median sulcus, not irregularly branched; ventral margins each with row of 9–12 moderately strong corneous spines. Propodi unarmed or with few small spines on dorsal surface mesially in proximal 0.2–0.3 in right, unarmed in left. Carpi each with double row of strong, sometimes corneous-tipped spines increasing in size

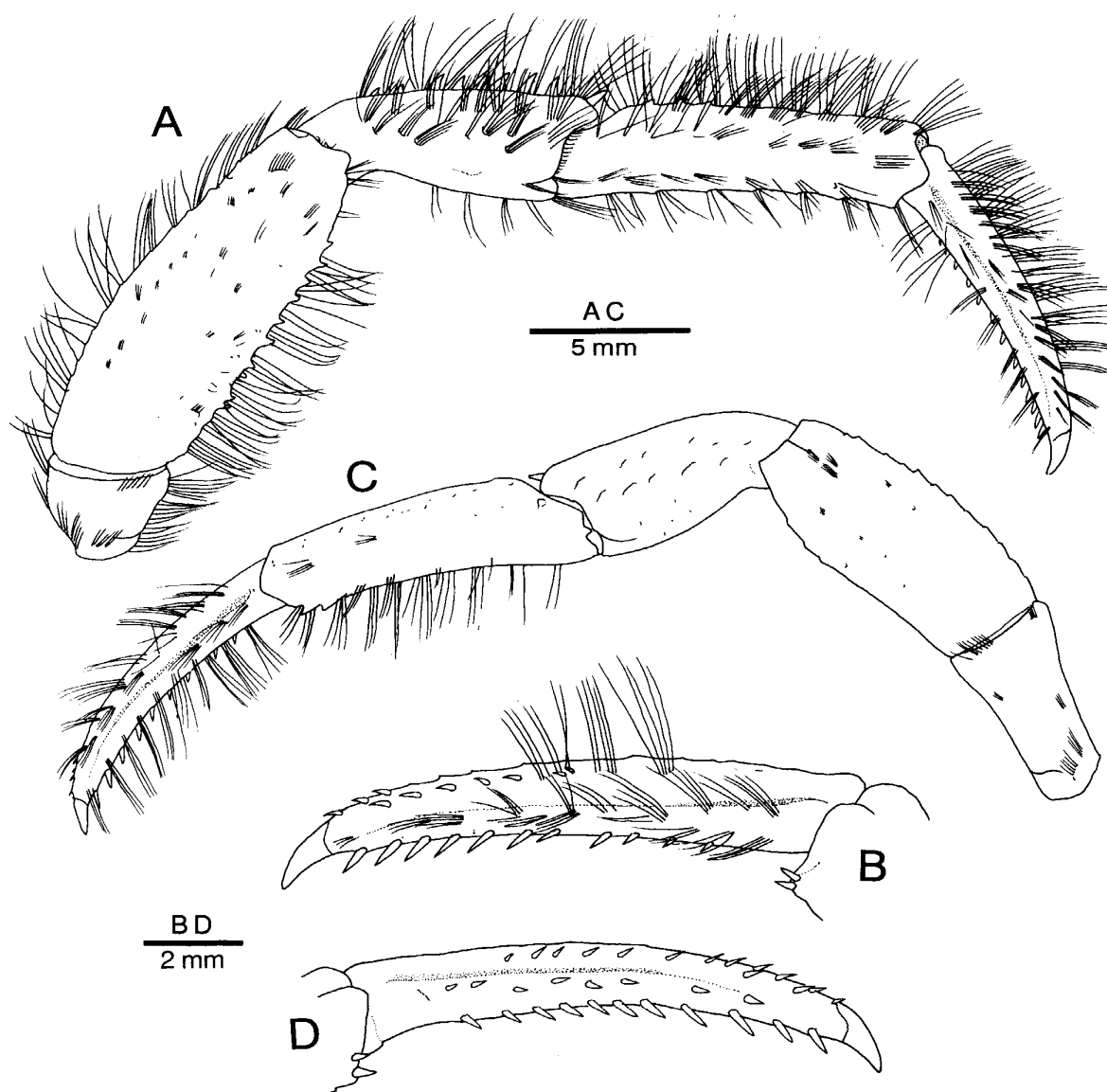


Fig. 10. *Pagurus proximus* sp. nov. Holotype, male (sl 10.0 mm; CBM-ZC 1684) from Miyako Bay, Iwate Prefecture. Ambulatory pereopods. A, right second pereopod, lateral; B, same, dactylus, mesial, setae partially omitted; C, left third pereopod, lateral, setae partially omitted; D, same, dactylus, mesial, setae omitted.

distally. Meri each with row of small spines (spines on left smaller and fewer than on right) on ventral surface, ventrolateral distal and ventromesial distal margins unarmed.

Right third pereopod with dactylus bearing 9–13 moderately strong corneous spines. Carpus unarmed or with few small spines on dorsal surface. Merus unarmed on ventral margin.

Left third pereopod (Fig. 10C) slightly more robust than right third, generally similar to second pereopods in setation generally. Dactylus (Fig. 10C, D) 1.0–1.2 times longer than propodus; dorsal surface without small spinulose tubercles proximally; lateral face unarmed or with short row of few small calcareous spines proximally.

imoventrally; mesial face with prominent median sulcus, not irregularly branched; ventral margin with 9–12 moderately small corneous spines. Propodus relatively slender, 2.7–4.1 times longer than deep; lateral face usually unarmed ventrally; ventral surface laterally with single row of small calcareous spines in distal 0.5 (spines increasing in size distally), usually not extending onto ventrolateral distal margin, and with row of sparse corneous spines mesially; setae arising from ventrolateral margin not very long. Carpus unarmed on dorsal surface, except for dorsodistal spine. Merus unarmed on ventral margin.

Fourth pereopods semi-chelate. Dactylus lacking preungual process. Propodal rasp well developed, composed of 4 irregular rows of corneous scales. Merus relatively slender.

Fifth pereopods chelate; males with paired gonopores partially encircled by tufts of short setae.

Anterior lobe of sixth thoracic sternite subsemicircular, slightly skewed to left; anterior face with numerous long setae.

Abdomen strongly spiraled, with 3 unpaired left pleopods in males, 4 unpaired ones in females. Uropods strongly asymmetrical.

Telson (Fig. 7C) with deep transverse indentations. Posterior lobes (Fig. 7D) slightly asymmetrical (left slightly larger than right), generally rounded, separated by deep, moderately narrow median cleft; terminal margins slightly oblique, each with prominent sinus, 2 or 3 strong, often curved, corneous-tipped spines, and additional 1 or 2 small corneous spinules between strong spines.

*Coloration in life* (Fig. 1C). Body, chelipeds, and ambulatory pereopods generally bluish gray. Shield generally light gray with irregular brown markings, and with median and 3 dorsolateral pairs of dark brown spots. Posterior carapace blue gray; cardiac region with paired brown spots. Ocular peduncles generally light yellowish brown, mesially with irregular reticulate or spotted gray markings. Antennular peduncles light gray-brown. Antennal peduncles generally gray-brown; fifth segment with longitudinal dark brown stripes laterally and mesially; third segment olive gray on mesial face; antennal flagellum light gray-brown, lateral and mesial faces dark brown, showing longitudinal stripes. Exopods of first to third maxillipeds and endopod of third maxilliped blue gray. Chelipeds generally gray-brown; chela with irregular markings of dark brown on dorsal surface, spines on dorsal surface sometimes light brown; dactylus and fixed finger distally tinged with light brown; carpi with irregular dark brown spots on dorsal surface proximally and lateral face, mesial face mottled with dark brown; spines on dorsal surfaces of carpi often light brown; meri blue-gray with scattered spots or blotches of dark brown on lateral and mesial faces; dorsal surface whitish distally. Ambulatory pereopods generally light blue-gray; dactyli brown on dorsal surfaces, lateral faces each with tinge of light brown distally and dark brown proximally, and with longitudinal stripe of dark brown on mid-line; lateral faces of propodi each with 2 longitudinal stripes (lateral and median) of dark brown and faint band of dark gray-brown in proximal 0.3; lateral faces of carpi each with 2 broad longitudinal stripes dorsally and ventrally (dorsal stripe becoming paler distally); lateral faces of meri each with scattered dark brown spots and tinge of dark gray-brown distally.

*Size.* Largest male, sl 10.0 mm; largest female, sl 7.0 mm; ovigerous females, sl 2.4–5.5 mm.

**Remarks.** The propodus of the right second pereopod is usually unarmed on the dorsal surface, but it sometimes bears a few small spines proximally or a row of small subacute or blunt spines or tubercles.

**Habitat.** Occupying a variety of gastropod shells.

**Distribution.** So far known from Peter the Great Bay, the continental coast of the Sea of Japan, Hakodate Bay, the Pacific coast of Honshu from Miyako Bay, Iwate Prefecture, southward to Boso Peninsula, and Niigata (Sea of Japan); intertidal to 10 m.

**Etymology.** From the Latin, *proximus*, nearest, in reference to the suggested close relationship of the new species to *P. brachiomastus*.

***Pagurus simulans* sp. nov.**

(Figs 1D, 11–14)

*Eupagurus brachiomastus*: Yokoya 1939: 282 (part).

*Pagurus brachiomastus*: Miyake 1978: 97, text-figs 36, 37.

*Pagurus sagamiensis* Miyake 1978: 116 (part).

*Pagurus pilosipes*: Miyake 1978: 91 (part).

**Material examined.** *Holotype*. Off Takeoka, Uchibo coast of Boso Peninsula, 30–40 m; 29 Oct 1997; commercial gill net; coll. T. Komai; male (sl 7.4 mm); CBM-ZC 5081.

*Paratypes*. Nakanose, Tokyo Bay; 10 May 1984; coll. T. Furota; 1 male (sl 6.7 mm); CBM-ZC 28.—Same data; 2 males (sl 3.1, 3.5 mm); CBM-ZC 29.—Off Heizaki, Miyako, Iwate Prefecture, ca. 100 m; 27 May 1995; crab trap; coll. T. Komai; 1 ovig (sl 4.1 mm); CBM-ZC 1691.—Funakoshi Bay, Iwate Prefecture, 39°23.634'N, 141°57.191'E, 66 m; sandy bottom, mixed with shell fragments; 25 May 1995; dredge; coll. T. Komai; 1 male (sl 3.9 mm), 1 ovig (sl 5.3 mm); CBM-ZC 1912.—Tateyama Bay, Boso Peninsula, 35°00.57'N, 139°41.45'E, 100–258 m; TRV “Shin'yo-maru” cruise to Izu Islands 1996, stn 16; 24 Oct 1996; dredge; coll. T. Komai; 1 male (sl 3.2 mm); CBM-ZC 4771.—Otsuchi Bay, Iwate Prefecture, 39°21.78'N, 142°00.19'E, 65 m; 14 Oct 1996; dredge; coll. T. Komai; 3 females (sl 3.1–3.2 mm); CBM-ZC 5072.—Off Choshi, south of Kashima-nada, 80–100 m; 18 Jan 1995; commercial trawler; coll. T. Komai; 1 female (sl 4.7 mm); CBM-ZC 5073.—Off Ohara, Sotobo coast of Boso Peninsula, 50–70 m; 18 Mar 1996; octopus pot; coll. T. Komai; 1 male (sl 2.8 mm); CBM-ZC 5074.—Off Takeoka, Uchibo coast of Boso Peninsula, 80–100 m; 2 Mar 1995; commercial gill net; coll. T. Komai; 1 ovig (sl 2.9 mm); CBM-ZC 5075.—Similar locality, 60–80 m; 20 Feb 1997; commercial gill net; coll. T. Komai; 1 ovig (sl 4.7 mm); CBM-ZC 5076.—Similar locality, 30–40 m; July 1997; commercial gill net; coll. T. Komai; 3 males (sl 2.4–2.7 mm), 4 females (sl 2.7–3.6 mm); CBM-ZC 5077.—Similar locality, 30–40 m; 26 Jan 1998; commercial gill net; coll. T. Komai; 1 male (sl 6.8 mm); CBM-ZC 5078.—Similar locality, 60–70 m; 16 Apr 1999; commercial gill net; coll. T. Komai; 1 ovig (sl 8.3 mm); CBM-ZC 5079.—Off Saiki, Bungo Strait, 80–120 m; coarse sand mixed with shell fragments; 7 Nov 1994; commercial trawler; coll. T. Komai; 5 females (sl mm); CBM-ZC 5080.—Off Takeoka, 30–40 m; 18 Feb 1995; gill net; coll. T. Komai; 1 male (sl 4.3 mm), 1 ovig (sl 4.1 mm); CBM-ZC 5086.—Similar locality, 30–40 m; 16 Jan 1997; gill net; coll. T. Komai; 1 male (sl 6.7 mm); CBM-ZC 5087.—Sim-

ilar locality, 30–40 m; 20 Feb 1997; gill net; coll. T. Komai; 2 males (sl 3.3, 3.4 mm); CBM-ZC 5088.—Similar locality, 20–30 m; 29 Oct 1997; gill net; coll. T. Komai; 2 males (sl 2.4, 2.8 mm); CBM-ZC 5089.—Similar locality, 40–50 m; 21 Dec 1997; gill net; coll. T. Komai; 1 female (sl 4.5 mm); CBM-ZC 5090.—Similar locality, ca. 40 m; 25 Oct 1999; gill net; coll. T. Komai; 6 males (sl 2.8–4.8 mm); CBM-ZC 5196.—Off Shioyazaki, Kashima-nada, 37°01.64'N, 141°18.32'E, 150–151 m; RV “Wakataka-maru”, stn G2-1; 16 Oct 1997; otter trawl; coll. K. Uchikawa; 1 male (sl 7.1 mm); CBM-ZC 5197.—Off Takeoka, 50–60 m; Apr 1999; gill net; coll. T. Komai; 1 male (sl 6.7 mm), 1 ovig (sl 3.6 mm); MNHN-Pg 5895.—Maruyama-dashi, Amadaiba, Sagami Bay, 90–95 m; 17 July 1959; 1 male (sl mm); paratype of *Pagurus sagamiensis* Miyake, 1978, det. No. 268; NSMT-CrR 1572.—Between Shiragane and Kakine, Sagami Bay, 20–35 m; 5 Feb 1964; 1 ovig (sl 3.6 mm); identified by Miyake (1978) as *Pagurus brachiomastus*, det. No. 534; NSMT-CrR 2190.—2 km off west-southwest of Jogashima Islet, Sagami Bay, 68 m; 24 Jan 1965; 1 male (sl 3.6 mm); identified by Miyake (1978) as *Pagurus brachiomastus*, det. No. 567; NSMT-CrR 2297.—4 km off west-southwest of Jogashima Islet, Sagami Bay, 100 m; 28 Jan 1965; 1 male (sl 6.0 mm); identified by Miyake (1978) as *Pagurus brachiomastus*, det. No. 578; NSMT-CrR 2308.—Same data; 1 female (sl 2.5 mm); det. No. 579; NSMT-CrR 2309.—2.5 km off west-northwest of Jogashima Islet, Sagami Bay, 65–75 m; 13 Feb 1965; 1 male (sl 3.0 mm); identified by Miyake (1978) as *Pagurus brachiomastus*, det. 585; NSMT-CrR 2320.—3 km off west-southwest of Jogashima Islet, Sagami Bay, 85 m; 25 Mar 1967; 1 male (sl 4.8 mm); identified by Miyake (1978) as *Pagurus pilosipes*, det. No. 627; NSMT-CrR 3533.

**Description.** Shield (Fig. 11A) with anterolateral margins sloping or slightly terraced; anterior margin between rostrum and lateral projections slightly concave. Rostrum overreaching lateral projections, broadly triangular, terminating in blunt or acute point. Lateral projections directed anterolaterally, each with small marginal spine. Posterior carapace with numerous tufts of setae, particularly laterally; accessory portions moderately narrow, their posterior margins distinctly narrower than breadth of posterior margin of shield.

Ocular peduncles (Fig. 11A) 0.64–0.80 times as long as shield, 3.5–4.5 times longer than width of cornea, weakly inflated basally; corneal region weakly dilated. Ocular acicles subtriangular or triangular, each with small submarginal spine.

Antennular peduncles (Fig. 11A) relatively long and slender, exceeding ocular peduncles by 0.3–0.4 length of ultimate segment. Ultimate segment 0.40–0.54 times as long as shield and 1.4–1.5 times longer than penultimate segment. Basal segment unarmed laterally; laterodistal process of statocyst lobe well developed.

Antennal peduncles (Fig. 11A) moderately short, reaching distal margin of cornea of ocular peduncles. First segment with ventromesial distal margin produced, with 2 small spines distolaterally. Antennal acicles moderately long, reaching midlength of fifth segment. Antennal flagella long, distinctly overreaching tip of right cheliped; each article distally with few short setae and several minute bristles.

Maxillule with endopod (Fig. 11B) bearing 1 seta on slightly produced inner lobe, outer lobe triangular, not recurved. Third maxilliped with ischium bearing well developed crista dentata; accessory tooth strong; merus with few tiny spinules on ventromesial margin, dorsodistal margin unarmed; carpus unarmed on dorsodistal margin; dactylus shorter than propodus; exopod reaching or slightly over-

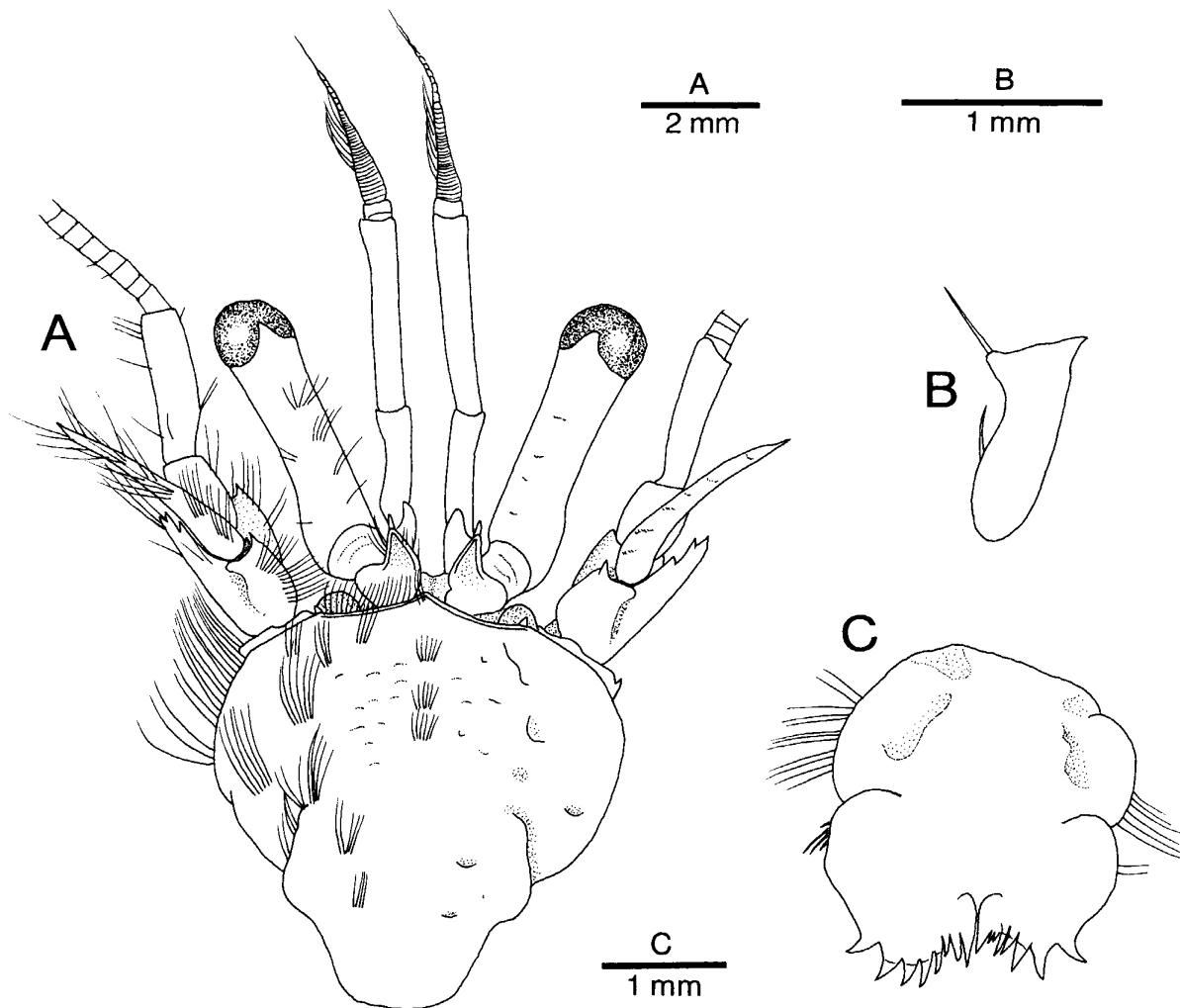


Fig. 11. *Pagurus simulans* sp. nov. Holotype, male (sl 7.4 mm; CBM-ZC 5081) from off Takeoka, Boso Peninsula. A, shield and cephalic appendages, dorsal, setae omitted from right side; B, endopod of maxillule, mesial; C, telson, dorsal.

reaching distal margin of merus.

Right cheliped (Fig. 12A–D) distinctly larger than left. Chela 2.2–2.5 times longer than broad, elongate suboval in dorsal view; lateral margin weakly convex; hiatus absent between dactylus and fixed finger. Dactylus slightly flattened distally, 1.0–1.1 times as long as palm; dorsal surface with row of strong, slender spines, extending near to tip; dorsomesial margin with single or double row of moderately small spines; mesial face unarmed; cutting edge with row of small calcareous teeth in proximal 0.7 and row of rudimentary corneous teeth in distal 0.3, terminating in small corneous claw. Palm shorter than carpus, weakly inflated ventrally; dorsal surface weakly convex, with moderately strong to strong spines arranged in 5 irregular rows (excluding dorsolateral and dorsomesial rows); spines relatively slender, increasing in size proximally, not inflated basally; dorsomesial margin with single row of strong spines, dorsolateral margin distinctly delimited with row of moderately strong to strong spines decreasing in size proximally and distally on fixed finger; mesial face with scattered moderately small spines; lateral

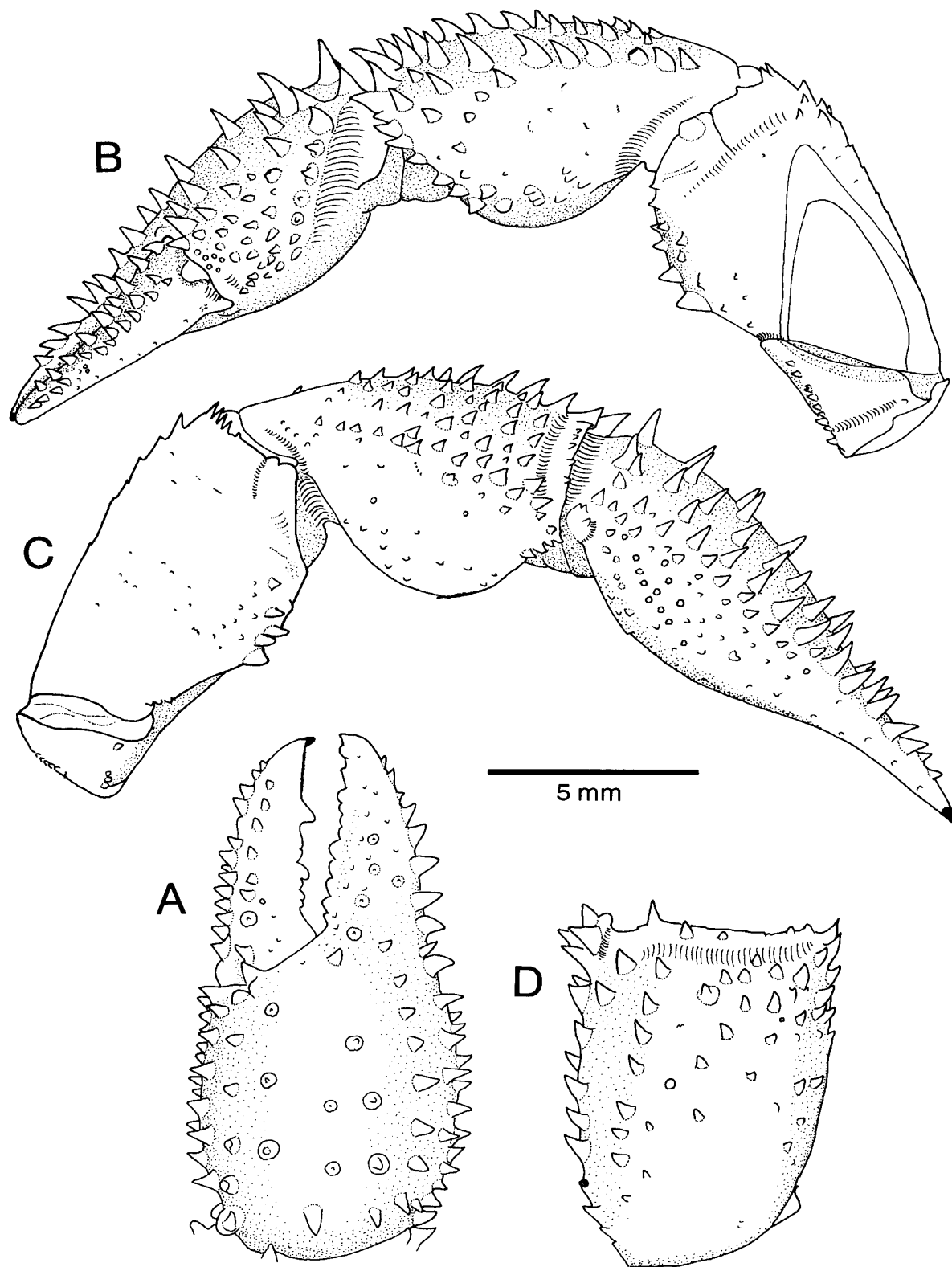


Fig. 12. *Pagurus simulans* sp. nov. Holotype, male (sl 7.4 mm; CBM-ZC 5081) from off Takeoka, Boso Peninsula. Right cheliped, setae omitted. A, chela, dorsal; B, entire cheliped, mesial; C, same, lateral; D, carpus, dorsal.

face with row of small spines adjacent to dorsolateral margin and scattered small tubercles; ventral surface with few small, low protuberances. Fixed finger flattened distally; cutting edge with row of rounded calcareous teeth (distal few calcareous teeth interspersed with short row(s) of tiny corneous teeth), terminating in small corneous or calcareous claw. Carpus moderately short, as long as or slightly shorter than merus, moderately inflated ventrally, slightly deeper than palm; dorsomesial margin with single or double row of strong spines; dorsal surface convex, with row of moderately strong to strong spines mesially and scattered small spines laterally; dorsolateral margin not delimited; dorsodistal margin with row of sparse spines; mesial face nearly flattened or slightly concave, with short row of moderately strong spines near dorsomesial margin and few spinulose tubercles ventrally, distal and ventral margins each with row of moderately strong spines or spinulose tubercles; lateral face ventrally with few small tubercles, distal margin dorsally with row of small spines; ventral surface convex, distally with few tiny tubercles. Merus moderately short and deep; dorsal surface with spinulose tubercles or multidenticulate protuberances and tufts of long setae in distal 0.2–0.3, remainder unarmed, distal margin with row of 5–8 small spines; mesial face with few low protuberances accompanied by tufts of setae subdistally and few small tubercles ventrally, ventromesial margin with row of few spines increasing in size proximally; lateral face spinulose, ventrolateral margin with row of few small spines; ventral surface with 2 prominent tubercles and few additional small spines and with numerous, scattered tufts of setae.

Left cheliped (Fig. 13A–D) moderately short and stout, slightly overreaching base of dactylus of right cheliped. Chela 2.4–2.6 times longer than greatest breadth and 1.1–1.2 times longer than carpus, with narrow hiatus between dactylus and fixed finger. Dactylus moderately short, 1.4–1.6 times longer than palm when measured along mesial margin, nearly straight in dorsal view; dorsal surface proximally with 2 short rows of small spines or tubercles; dorsomesial margin with row of sparse, small tubercles in proximal 0.7–0.8; mesial and ventral faces unarmed; cutting edge with row of small corneous teeth over entire length, terminating in strong corneous claw. Palm moderately short, 0.4–0.5 times as long as carpus, weakly inflated ventrally; dorsal surface with few small tubercles laterally and row of small spines adjacent to dorsomesial margin, noticeably elevated median area with 2 rows of moderately strong to strong spines extending onto fixed finger as single or double row of spines decreasing in size distally; lateral margin delineated by double row of moderately strong spines decreasing in size proximally and distally on fixed finger; dorsomesial margin not distinctly delimited, but with row of sparse, small spines or tubercles; mesial face with scattered small spines and tubercles; ventral surface with few small tubercles. Cutting edge of fixed finger with row of small calcareous teeth interspersed with short row of small corneous teeth in distal half, terminating in strong corneous claw. Carpus almost equal to merus in length; dorsal surface slightly oblique, unarmed, dorsomesial and dorsolateral margins each with row of moderately strong to strong spines (spines on dorsolateral row smaller than those on dorsomesial row); dorsodistal margin with few spines; mesial face with few small protuberances and short, obliquely vertical rows of long setae, ventrodistal margin unarmed or with few protuberances; lateral face with few small tubercles ventrally and scattered tufts of long setae, ventrolateral margin with row of small spines or tubercles; ventral surface with few

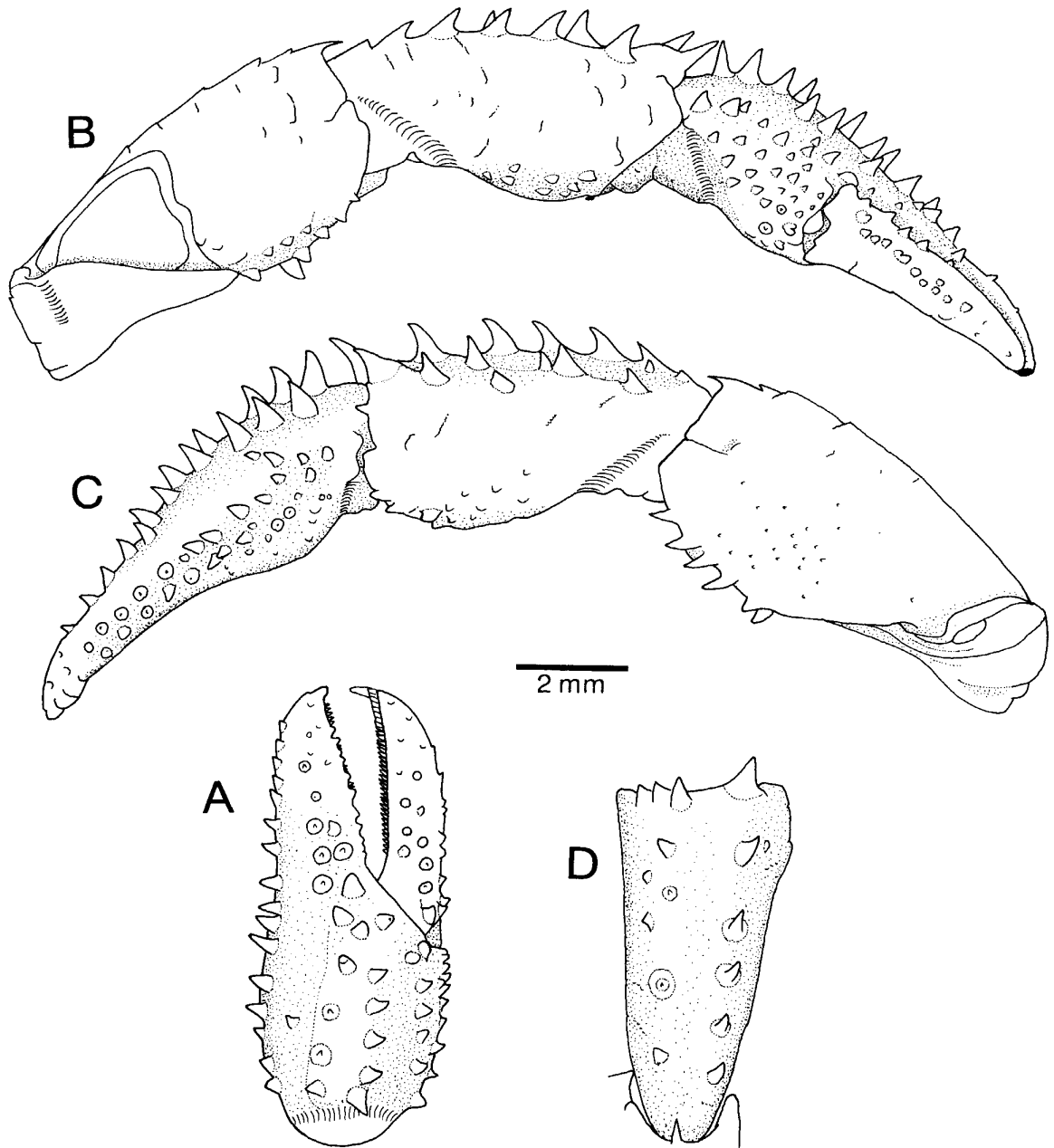


Fig. 13. *Pagurus simulans* sp. nov. Holotype, male (sl 7.4 mm; CBM-ZC 5081) from off Takeoka, Boso Peninsula. Left cheliped, setae omitted. A, chela, dorsal; B, entire cheliped, mesial; C, same, lateral; D, carpus, dorsal.

low protuberances. Merus slightly compressed laterally; dorsal surface with row of low protuberances, these becoming denticulate, transverse ridges distally; dorso-distal margin unarmed or with 1–3 spines; mesial face with short, vertical ridges subdistally and few low protuberances ventrally, ventromesial margin with row of moderately small spines; lateral face spinulose ventrally, ventrolateral margin with row of moderately strong spines (proximalmost spine stronger than others); ventral surface unarmed.

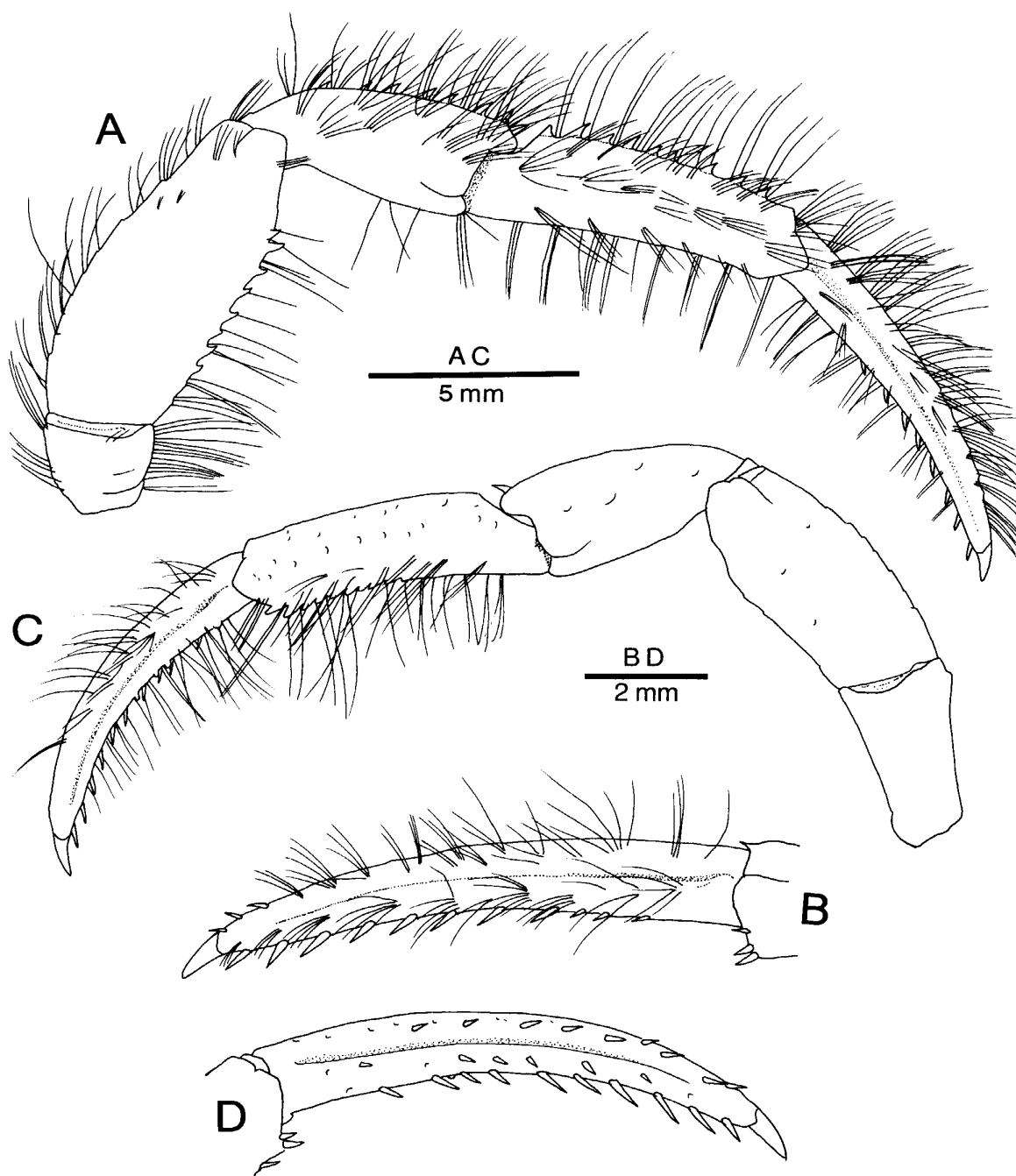


Fig. 14. *Pagurus simulans* sp. nov. Holotype, male (sl 7.4 mm; CBM-ZC 5081) from off Takeoka, Boso Peninsula. Ambulatory pereopods. A, right second pereopod, lateral; B, same, dactylus, mesial, setae partially omitted; C, left third pereopod, lateral, setae partially omitted; D, same, dactylus, mesial, setae omitted.

Second pereopods (Fig. 14A) moderately long and relatively slender, reaching or slightly overreaching right cheliped. Dactyli (Fig. 14A, B) moderately short, 1.1–1.3 times longer than propodi; lateral and mesial faces each with rather faint median sulcus, not irregularly branched; ventral margins each with row of 8–12

moderately strong corneous spines. Propodi with row of moderately strong spines over entire length in right, and with row of small spines in proximal 0.5–0.6 in left. Carpi each with single or double row of moderately strong, sometimes corneous-tipped spines. Meri each with row of small spines on ventral surface, but ventrolateral distal and ventromesial distal margins unarmed.

Right third pereopod with dactylus bearing 9–14 moderately strong corneous spines. Carpus unarmed or with few small spines on dorsal surface. Merus unarmed on ventral margin.

Left third pereopod (Fig. 14C, D) slightly more robust than right one. Dactylus 1.1–1.2 times longer than propodus; dorsal surface proximally with few small spines; lateral face ventrally with row of small calcareous spines or tubercles in proximal half; mesial face with shallow median sulcus, not irregularly branched; ventral margin with 9–12 moderately strong corneous spines. Propodus relatively slender, 3.10–3.87 times longer than deep; lateral face usually unarmed ventrally; ventral surface laterally with single or double row of small calcareous spines in distal 0.5 (spines increasing in size distally), not extending onto ventrolateral distal margin, and with row of sparse corneous spines mesially; setae arising from ventrolateral margin very long. Carpus unarmed on dorsal surface, except for dorsodistal spine. Merus unarmed on ventral margin.

Fourth pereopods semi-chelate. Dactylus lacking preungual process. Propodal rasp well developed, composed of 3 or 4 irregular rows of corneous scales. Merus relatively slender.

Fifth pereopods chelate; males with paired gonopores partially encircled by tufts of short setae.

Anterior lobe of sixth thoracic sternite subsemicircular, slightly skewed to left; anterior face with numerous long setae.

Abdomen strongly spiraled, with 3 unpaired left pleopods in males, 4 unpaired ones in females. Uropods strongly asymmetrical.

Telson (Fig. 11C) with deep transverse indentations. Posterior lobes slightly asymmetrical (left lobe slightly larger than right), generally rounded, separated by deep, narrow median cleft; terminal margins slightly oblique without prominent sinus, with 6–8 strong, often curved, corneous-tipped spines and sometimes with 1 or 2 additional small corneous spinules between strong spines.

*Coloration in life* (Fig. 1D). Body, chelipeds, and ambulatory pereopods (Fig. 1D) generally brown. Shield mottled brown, with 4 pairs of dark brown spots; posterior carapace reddish brown, with pairs of large dark brown spots on cardiac region. Ocular peduncles light brown, without any marking. Antennular and antennal peduncles uniformly light brown. Palm of chelipeds tinged with dark brown dorsolaterally; carpi with scattered dark brown spots on dorsal and lateral surfaces, mesial face with dark brown blotch; meri with scattered dark brown spots on lateral and mesial faces. Dactyli of ambulatory pereopods proximally with dark brown band; propodi each with dark brown band in proximal 0.3 and spots or blotches of dark brown on dorsal surface; carpi proximally tinged with dark brown and with scattered dark brown spots on lateral faces; meri sometimes whitish distally, with scattered dark brown spots.

*Size.* Largest male, sl 7.2 mm; largest female, sl 8.3 mm; ovigerous females, sl 2.9–8.3 mm.

**Habitat.** Occupying a variety of gastropod shells.

**Distribution.** So far known only from the Pacific coast of Japan, from Iwate Prefecture to the Boso Peninsula and the Bungo Strait; 30–258 m.

**Etymology.** From the Latin, *simulans*, imitating, in reference to the similarity between the new species and *P. brachiomastus*.

### Comparison

The three species treated in this paper are clearly distinguished from most of the other species of *Pagurus* in the western and northern Pacific by the following set of characters: the palm of the right cheliped is spinose and setose; the carpus of the right second pereopod is armed with a single or double row of spines; the dactyli of the ambulatory pereopods are each armed with a single row of moderately strong corneous spines on the ventral margin; and the dactylus and propodus of the left third pereopod are armed with a single or double row of small calcareous spines or tubercles on the ventral surface laterally. *Pagurus nigrofascia* Komai, 1996, appears closest to these three species, but it is immediately separated from them by the possession of a few spines on the ventrodistal margin of the carpus of the left third pereopod by the tiny spines on the terminal margins of the telson, and by the coloration in life (Komai, 1996). *Pagurus nigrofascia* has a black band on each propodus of the ambulatory pereopods.

Although the three species are very similar to one another in their external morphology, the following characters are useful in discriminating among them (Table 1): relative lengths of the ocular peduncle and of the ultimate segment of the antennular peduncle; development of the corneal region of the ocular peduncle; shape of the external lobe of the maxillule endopod; armature of the right palm; armature of the propodus of the right second pereopod; conformation of the left palm; stoutness of the ambulatory pereopods; and the armature of the terminal margins of the telson.

The ocular peduncle is shortest in *P. brachiomastus*, and longest in *P. simulans*, with *P. proximus* in an intermediate position. The ratios of “ocular peduncle length/shield length” are as follows: 0.48–0.63, 0.57 on average (N=31), in *P. brachiomastus*; 0.53–0.76, 0.58 on average (N=28), in *P. proximus*; 0.64–0.83, 0.72 on average (N=30) in *P. simulans*. This character is useful to distinguish *P. brachiomastus* and *P. simulans*, because there is no overlap. In addition, the corneal region of the ocular peduncle is weakly dilated in *P. simulans*, but it is not dilated in either *P. brachiomastus* or *P. proximus*.

The ultimate segment of the antennular peduncle is proportionally longer in *P. simulans* than in *P. brachiomastus* and *P. proximus*. The ratios of “ultimate segment length/shield length” are as follows: 0.22–0.34, 0.29 on average (N=31), in *P. brachiomastus*; 0.25–0.35, 0.31 on average (N=28), in *P. proximus*; 0.31–0.54, 0.47 on average (N=31) in *P. simulans*.

The triangular, not recurved, external lobe of the endopod of the maxillule separates *Pagurus simulans* from *P. brachiomastus* and *P. proximus*.

The spines on the dorsal surface of the right cheliped palm are much fewer in *P. simulans* than in *P. brachiomastus* or *P. proximus*. They are arranged in five irregular rows in *P. simulans* and in six or seven irregular rows in *P. brachiomastus* and *P. proximus*, excluding the dorsomesial and dorsolateral rows. In addition, the

Table 1. Differences between *Pagurus brachiomastus* (Thallwitz, 1891), *P. proximus* sp. nov. and *P. simulans* sp. nov. Figures given in parentheses indicate means.

Items	<i>P. brachiomastus</i>	<i>P. proximus</i> sp. nov.	<i>P. simulans</i> sp. nov.
Ocular peduncle length/shield length	0.48–0.63 (0.57; N=31)	0.53–0.76 (0.58; N=28)	0.64–0.83 (0.72; N=30)
Corneal region of eye	not dilated	not dilated	weakly dilated
Antennular peduncle	0.22–0.34 (0.29; N=31)	0.25–0.35 (0.31; N=28)	0.31–0.54 (0.47; N=31)
ultimate segment length/shield length			
External lobe of endopod of maxillule	recurved	recurved	not recurved
Dorsal spines on right palm	arranged in 6 or 7 rows	arranged in 6 or 7 rows	fewer, arranged in 5 rows
Ventrolateral margin of left palm	noticeably delimited	rounded	rounded
Propodus of right second pereopod	with row of moderately strong spines dorsally	unarmed or with row of small spines or tubercles dorsally	with row of moderately strong spines dorsally
Propodus of left third pereopod length/depth	2.08–2.89 (2.42; N=33)	2.67–4.10 (2.96; N=27)	3.06–3.87 (3.40; N=28)
Terminal margins of telson	each with 5–7 strong spines, without hiatus	each with 3 or 4 strong spines and additional 2 or 3 spinules and with hiatus between strong spines	each with 5–7 strong spines, without hiatus
General color			
Color of tips of chelae, and ambulatory pereopods	dark olive gray	olive gray	brown
Color of carpi and propodi of ambulatory pereopods	red	light yellowish brown	whitish
	without lateral stripes	with 2 dark lateral stripes	without lateral stripes

spines are much more elongate in *P. simulans* than in the other two species (cf. Figs 4, 8, 12).

*Pagurus brachiomastus* is characterized by the clearly delimited ventrolateral margin of the left palm; thus the cross section of the left palm at the base of the dactylus is laterally angular. In contrast, in the two new species, the lateral face of the left palm is rounded, without a distinctly delineated dorsolateral or ventrolateral margin.

The ambulatory pereopods are more robust in *P. brachiomastus* than in the two new species. The relative stoutness of the propodus of the left third pereopod is used as an indicator. The ratios of "propodus length/depth" are as follows: 2.08–2.89, 2.42 on average (N=33), in *P. brachiomastus*; 2.67–4.10, 2.96 on average (N=27) in *P. proximus*; and 3.06–3.87, 3.40 on average (N=28) in *P. simulans*.

The propodus of the right second pereopod is armed with a row of moderately strong spines on the dorsal surface in *P. brachiomastus* and *P. simulans*, while it is unarmed or bears a row of small spines or tubercles in *P. proximus*.

The armature of the terminal margins of the telson is useful in discriminating *P. proximus* from *P. brachiomastus* and *P. simulans*. In *P. proximus*, each terminal margin usually bears three or four strong spines and additional two or three spinules in a deep sinus, while in *P. brachiomastus* and *P. simulans*, these margins are armed with five to seven strong spines and a sinus is lacking.

In addition to these morphological differences, the three species are readily separated in life by their characteristic coloration (Table 1). *Pagurus brachiomastus* is recognizable by the distally red colored chelae and dactyli of the ambulatory pereopods. *Pagurus proximus* is characterized by having two longitudinal stripes of dark brown on the lateral faces of the second and third pereopods. *Pagurus simulans* differs from these two species in the generally brown chelipeds and ambulatory pereopods, lacking either the red markings on the tips of the chelae and ambulatory pereopods or longitudinal stripes on the lateral faces of the propodi and carpi of the ambulatory pereopods.

From the distributional patterns observed (Fig. 15), it would appear that the three species are geographically or bathymetrically separated. *Pagurus brachiomastus* is recorded from the Pacific and Okhotsk coasts of Hokkaido, Sakhalin and Peter the Great Bay, and the continental coast of the Sea of Japan. *Pagurus proximus* occurs in the Tsugaru Strait coast of Hokkaido, Mutsu Bay, Niigata (Sea of Japan), the Pacific coast of Honshu from Iwate Prefecture to the Boso Peninsula, and Peter the Great Bay. *Pagurus simulans* is so far known only from the Pacific coast of Honshu from Iwate Prefecture to Sagami Bay and in the Bungo Strait (off Saiki, Oita Prefecture, Kyushu). *Pagurus brachiomastus* and *P. proximus* have overlapping bathymetrical ranges between the intertidal zone and 10 m in depth, but they appear to be separated geographically. Only along the coast of the Tsugaru Strait and the continental coast of the Russian Far East, are these two species likely to overlap, although there has as yet been instance where the two species were collected from the same location. According to Dr. S. Wada (pers. comm.), the distributional boundary of the two species in Hokkaido lies around Shiokubimisaki on the Tsugaru Strait, situated about 30 km east of Hakodate. Although the geographical ranges of *P. proximus* and *P. simulans* greatly overlap on the Pacific coast of northeastern Honshu, they are separated bathymetrically. *Pagurus proximus* occurs from the intertidal zone to a subtidal depth of 10 m, whereas *P. simu-*

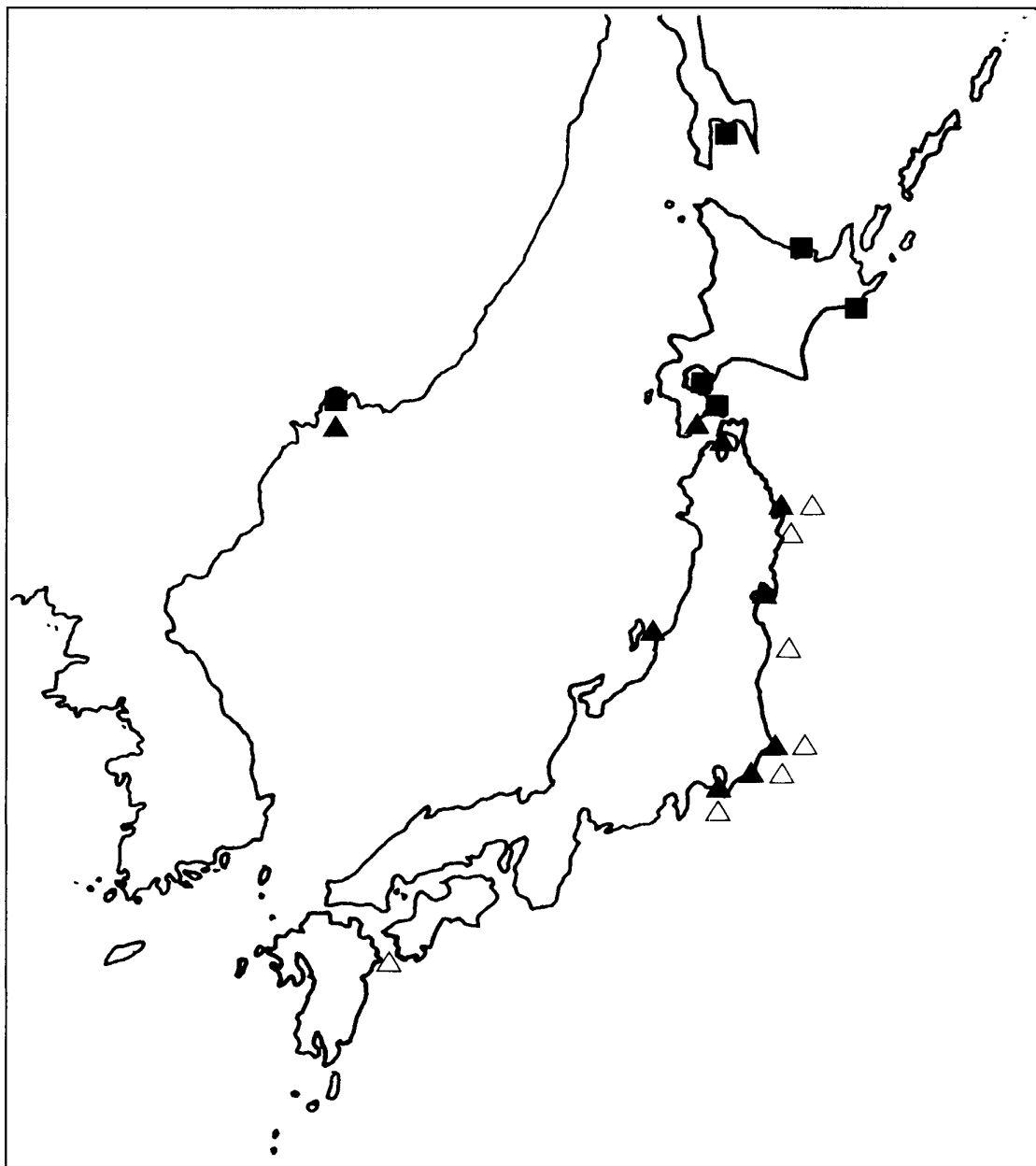


Fig. 15. Map of Japan and continental coast, showing distribution of *Pagurus brachiomastus* (Thallwitz, 1891) (black squares), *P. proximus* sp. nov. (black triangles), and *P. simulans* sp. nov. (open triangles).

*lans* has a wide bathymetric range from 30 to 258 m.

### Discussion

As mentioned previously, the holotype of *Eupagurus brachiomastus* was lost during the last year (1945) of World War II. Thallwitz's (1891) original description was rather brief and no illustration was given; the type locality was indicated only

as “Japan oder China”. Therefore, it is impossible to be certain of the identity of Thallwitz’s species. In order to establish the taxonomic status, a neotype of *Pagurus brachiomastus* has been designated herein.

As discussed by Komai (2000), there has been confusion regarding *Pagurus brachiomastus* and *P. pectinatus* (Stimpson, 1858) in earlier literature. In his “Remarks” under an account of *Eupagurus pectinatus*, Urita (1942) stated as follows: “Although the young of this species, which has hairy chela with a naked coloured tip, is very common in the shallow waters of Saghalien, the adult species which is found on Notoro, Kaibato Is., Maoka, Noda, Tomarioru, Esutoru (Author); and off Tomarioru, lodges in the internal chamber of the Sponge [*Suberites domuncula* (Olive)].” From this statement, it is clear that his material of *Eupagurus pectinatus* actually contained both *P. brachiomastus* and *P. pectinatus*. *Pagurus pectinatus* often inhabits this sponge (Makarov 1938, 1962; Komai 2000), whereas *P. brachiomastus* uses a gastropod shell. The color photographs referred to *P. pectinatus* by Miyake (1975, unnumbered figure on p. 116; 1982, pl. 44, fig. 3) and Takeda (1994, figs 1 and 2 on p. 228) all depict *P. brachiomastus*. During the reexamination of the hermit crab material studied by Balss (1913), I have found that one of the five lots identified as *P. pectinatus* (as *Eupagurus*) (ZSM 296/2) certainly represents *P. proximus*.

Kikuchi (1932) reported *P. brachiomastus* from Toyama Bay, Sea of Japan coast of Honshu, but he gave no information on his material. Nevertheless, from the present information on the geographical ranges of the three species, it is likely that Kikuchi was actually reporting *P. proximus*, instead of true *P. brachiomastus*. Takeda and Miyauchi (1992) also reported *P. brachiomastus* from Soya Strait, northern Hokkaido. They mentioned the presence of prominent tubercles on the ventral surface of the right cheliped merus, but since they gave no further information on their specimen, it is impossible to determine whether their specimen represents *P. brachiomastus* or *P. proximus*.

Yokoya (1939) reported *P. brachiomastus* (as *Eupagurus*) from three locations in Onagawa Bay, Miyagi Prefecture (two males and three ovigerous females from Koshikine at a depth of 19 m; 2 females from Shiranesaki at depth of 34 m; and 2 females from Onagawa Harbor at a depth of 10 m). It can be inferred from the known geographic and bathymetric ranges of the species that the specimens from Shiranesaki and from Onagawa Bay are likely to have been *P. simulans* and *P. proximus*, respectively. Actually, Yokoya (1939) mentioned the presence of “spinulous tubercles” on the dorsal surface of the right palm and the dorsal margin of the propodi of the second pereopods. His illustration (Yokoya 1939, fig. 12) does not appear to be very accurate, but it depicts short spines on the right palm and a row of small tubercles on the dorsal margin of the right second pereopod. These features are consistent with *P. proximus*. It is impossible to conclude which species was actually represented by the specimens from Koshikine, because both *P. proximus* and *P. simulans* are likely to occur there at depths of about 19 m.

Kim (1970, 1973) reported *Pagurus brachiomastus* from Korea. The individual shown in the photograph given by Kim (1973, pl. 70, fig. 36) is most certainly referable to *Pagurus proximus*, rather than *P. brachiomastus* or *P. simulans*, because it has relatively long and slender ambulatory pereopods and undilated corneas of the eyes. Therefore, the records of *P. brachiomastus* from Korea (Kim 1970, 1973) are referred to *P. proximus*.

Five of the seven lots of Miyake's (1978) *P. brachiomastus* from Sagami Bay were reexamined and found to be *P. simulans*. However, the color photographs published by Miyake (1978, pl. 1, figs 7, 8) are certainly referable to the true *P. brachiomastus*. Miyake gave no information on the photographed specimens, and it is probable that the specimens came from Hokkaido, not from Sagami Bay. Additionally, it has been found that the male specimen referred to *P. pilosipes* (Stimpson, 1858) by Miyake (1978) (Miyake det. No. 627; NSMT-CrR 3533) actually represents *P. simulans*. Komai (1999) indicated that one of the paratypes of *P. sagamiensis* Miyake, 1978 was referable to the *P. brachiomastus* species complex. I have now confirmed that the specimen represents *P. simulans*.

Takeda and Hayashi (1990) recorded *P. brachiomastus* from off Hiroo, eastern Hokkaido, at a depth of 200 m. They indicated only the presence of long spines on the right palm of their specimen. The collection locality and depth and the superficial similarity suggest that they were probably reporting *P. parvispina* Komai, 1997, instead of *P. brachiomastus*.

Konishi and Quintana (1987) described the larval stages of *Pagurus brachiomastus* based on laboratory reared material. Dr. Konishi kindly informed me that the larvae they examined were obtained from a single female from Akkeshi, eastern Hokkaido, which had red-colored tips on the dactyli of the chelipeds and ambulatory pereopods. There is little doubt that their specimen represented true *P. brachiomastus*.

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